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Metal Products Manufacturing

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TECHNOLOGY DEPARTMENT

Serving the Appliance and Fabricated Metal Products Industry

Details of the Hotpoint 1960 Refrigerator—Page 42

Fabricating Spheres for the Hoover Constellation—Page 32

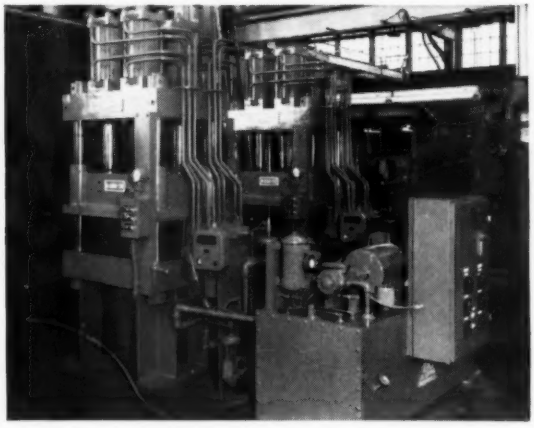
A Customer Oriented . . . Appliance and TV Service—Page 36

You name it—CLEARING will help you make it BETTER

with HYDRAULIC PRESSES like these...

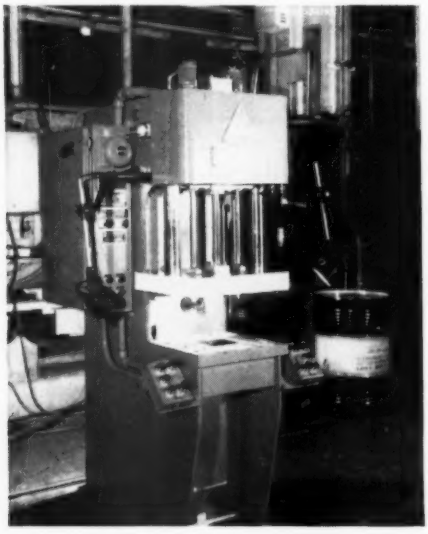
HEATING & AIR CONDITIONING PARTS—*FORMED*

Sheet metal parts are drawn on this 750 ton press designed to handle off-center loads with blank and draw dies using individually controlled cushions.



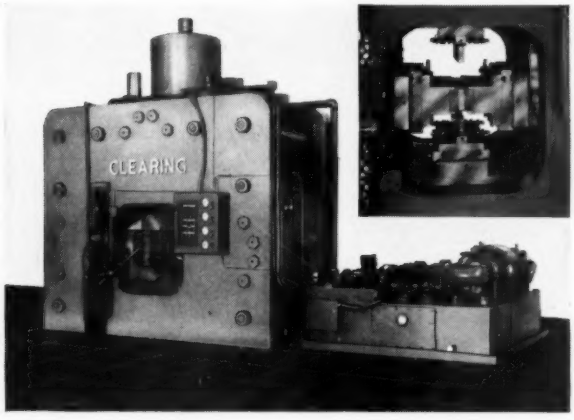
BOWLING BALLS—*MOLDING*

These two steam heated, 200 ton column-type hydraulic presses are designed for multiple cavity molding and operated from a single power source.



DIE CASTING—*TRIMMING*

High speed trimming is done on this 10 ton hydraulic gap press.



TITANIUM—*BRIQUETTING*

Four slides exerting 3,000 tons produce titanium briquettes. Inset shows 4 slide arrangement.

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ARMCO ENAMELING IRON

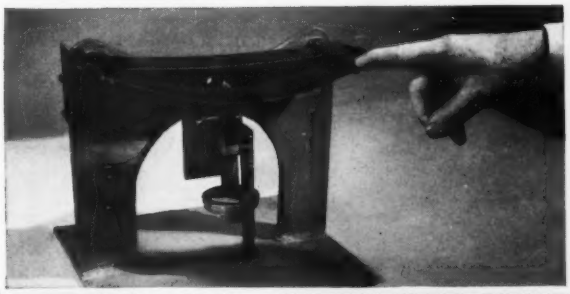
resists sag, reduces defects, helps you sell

New steels are born at Armco

It's made only for porcelain enameling

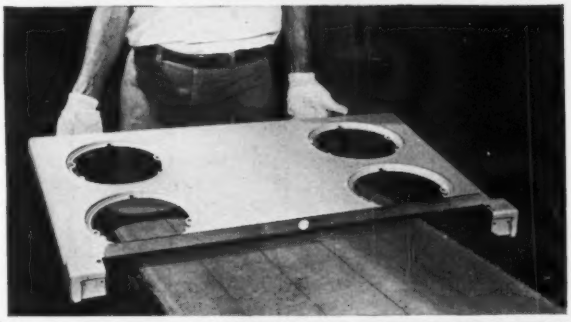
Resists sag

Fired at the same temperature, mild steel (front) droops badly, while Armco Enameling Iron (rear) stubbornly resists sag. With this special enameling base, critical dimensions of porcelain enameled parts stay accurate.



Fewer finish defects

Commercially-pure Armco Enameling Iron contains a minimum of gas-forming impurities. Because of its high purity, costly shop rejects for finish defects stay low.



Helps you sell

At point of purchase, where competing products often stand side by side, close fit of parts and defect-free finish help clinch sales.

For shop savings and showroom sales, specify top-quality Armco Enameling Iron. It's made *only* for porcelain enameling. Just send the coupon for complete information.

ARMCO STEEL CORPORATION
3009 Curtis Street, Middletown, Ohio

Please send me a copy of the catalog, "Armco Enameling Iron."

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Firm_____

Street_____

City_____ Zone____ State_____

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New N-10 Another DETROIT Exclusive

guarantees a full tub with pressures from 5 to 20 psi

here's how

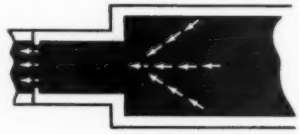
One thing about a housewife—she can really complain when her appliances don't perform as they should. Take a washing machine, for example. She'll never understand that varying water pressures caused by a low-volume well, heavy summer lawn sprinkling or low pressure suburban systems, will frequently prevent her from getting a full tub of water. And the onus in her mind is strictly on the manufacturer.

But it needn't be. Detroit Controls has just announced a new—*improved*—N-10 washing machine valve that provides a full tub despite water pressures which might vary from 5 to 20 psi or more! The secret is a new device that assures positive flow control under abnormal pressures. And, of course, it provides equally top performance during normal conditions. The valve has been proven on leading automatics.

Write Detroit Controls, 5900 Trumbull, Detroit 8, Michigan for complete information.

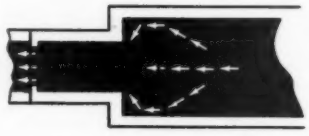
FULL PRESSURE

. . . depresses the flow-control washer into a spring-loaded seat. Water passes through center orifice only.



LOW PRESSURE

. . . is not sufficient to seat the flow-control washer. Water passes around washer as well as through the center orifice.



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DETROIT CONTROLS DIVISION

JANUARY • 1960

VOL. 17 • NO. 1

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METAL PRODUCTS MANUFACTURING

FROM RAW METAL TO FINISHED PRODUCT

A trade publication devoted to the interests of the metal products manufacturing industry with special editorial attention to home appliances. The editorial scope covers design, engineering, market and statistical information and technical and practical information on plant facilities and all phases of manufacturing "from raw metal to finished product." Free controlled circulation to top management, purchasing, engineering and key plant management and supervision in metal product manufacturing plants. To others, subscription price is $8.00 per year, domestic. To all other countries $10.00 per year (U.S. funds). Single copies, $1.00.

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HOW APOLLO GLAMOR METALS
Open New Channels to Profit and Sales

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6. **Expert assistance**—APOLLO'S factory-trained staff will work with you from the design stage to finished product . . . just ask for help.

New Channels to Sales . . . . . .

1. **In the home**—relaxed living is taking over and so is metal. APOLLO Metals are abreast of the trend with a full range of finishes and forms ideal for kitchen accessories and appliances • living, dining and family room furniture trim • lighting fixtures, lamps and lamp shades • attractive, unbreakable decorator items from wall plaques and picture frames to trays and planters • every conceivable home item where metal makes living easier.
2. **Commercial and business**—the horizon is unlimited, so are APOLLO Pre-Finished Metals. Pick your market: counter trim, restaurant accessories and appliances • automatic vending equipment • advertising displays that sparkle as only metal can • novelties • low cost, attractive gift items • salesmen's pass-ons • metals that meet commercial and business needs for quality, prestige and economy.

Call an APOLLO representative and tell him you want more facts about new channels to profit and sales...or get information direct from our factory

Apollo METAL WORKS

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CHICAGO 38, ILLINOIS

Factories in Chicago, Ill., and Bethlehem, Pa. • • • Nationwide Representation

MAC-BOND 71-D
A 3-STAGE METAL PREPARATION SYSTEM

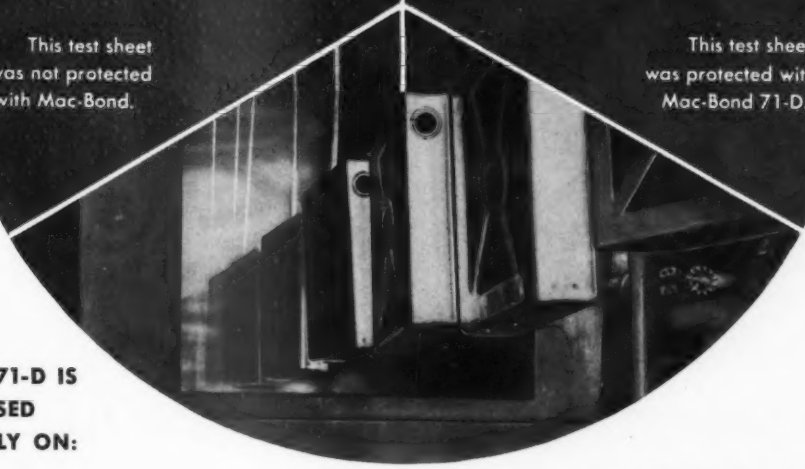
THE SIMPLIFIED PHOSPHATE OPERATION

THAT GIVES THE PERFECT PAINT BOND

1 Combination cleaner and phosphatizer.

2 Water rinses.

3 Provides a chemically sealed coating for maximum corrosion resistance.



MAC-BOND 71-D IS BEING USED SUCCESSFULLY ON:

CAMERAS • MOLDING • APPLIANCES • TAPE RECORDERS • TV CABINETS • LAWN FURNITURE • TOYS • OFFICE FURNITURE • AND MANY OTHER PRODUCTS

Mac-Bond 71-D is a highly efficient and economical cleaner and phosphatizer suitable for pressure washers and still-tank cleaning and giving a maximum paint bond and rust resistant coating.

Metal products manufacturers, both large and small, are finding the Macco 3-Stage System is solving their paint-adhesion problems with utmost dependability and economy. (*Also adaptable for one to six stage operations.*)

WRITE OR PHONE FOR A MACCO SERVICE ENGINEER TO SHOW YOU HOW THIS SYSTEM CAN SAVE YOUR PLANT MANY OPERATING DOLLARS

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THERE'S A MACCO CLEANER COMPOUNDED TO SOLVE YOUR PARTICULAR PROBLEM • PHONE PRESCOTT 9-0800

Interstate Gets a Higher Quality Finish and Paint Mileage is More Than Doubled with

RANSBURG

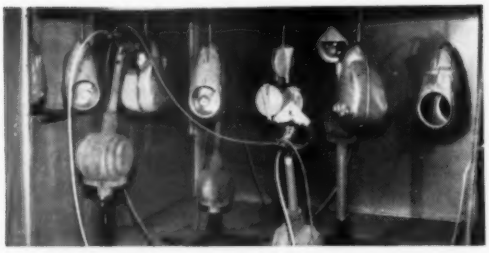
NO. 2 PROCESS ELECTROSTATIC SPRAY PAINTING

in finishing

COMPACT VACUUM CLEANERS

Interstate Engineering Corporation in Anaheim, Calif. switched from hand spray to Ransburg automatic Electro-Spray in the painting of their quality line of home renovating products: The COMPACT vacuum cleaner . . . the POLISH-AIRE floor polisher . . . and MAGIC DISC carpet and rug sweeper.

RESULTS? Quality of the painting improved, for with former hand spray, rejects used to run as high as 10%. That's because of Interstate's high quality standards. Now, with Electro-Spray, rejects are cut to less than 2%! This alone would have justified the change, but Ransburg Electro-Spray also provides substantial labor and material savings. One operator now does the work of two. And, with the former method, Interstate was painting only 28 sets of parts per gallon of paint. Now, they get 57 sets of parts per gallon. Think of what 50% savings would mean in YOUR finishing department.



Vacuum cleaner parts are painted with wrinkle enamel as they pass through the electrostatic spray painting area in the finishing department at Interstate Engineering Corp. Unpainted parts, entering from the right, are coated uniformly by the two Ransburg atomizing bells on either side of the line.

NO REASON WHY YOU CAN'T DO IT, TOO!

Let us show YOU and test-prove the advantages of automatic electrostatic spray painting on YOUR products in our complete laboratories. Call or write for our No. 2 Process brochure which shows a variety of automatic painting installations on a wide variety of products in both large and small plants. Or, if your production doesn't justify automatic painting, let us tell you about the new No. 2 Process Electrostatic Hand Gun which can be used in either conveyorized, or non-conveyorized painting.

RANSBURG

RANSBURG

Electro-Coating Corp.

Box-23122, Indianapolis 23, Indiana

INDUSTRY MEETINGS

NARDA CONVENTION

National Appliance and Radio-TV Dealers Association's Convention, Merchandise Mart, Chicago, January 3, 1960, and Conrad Hilton Hotel, Chicago, January 4-5, 1960.

HOME FURNISHINGS

International Home Furnishings Market, The Merchandise Mart, Chicago, January 4-15, 1960.

ELECTRICAL CONFERENCE

The Fourth Annual "Live Better Electrically" Womens' Conference, Edgewater Beach Hotel, Chicago, January 7-9, 1960.

HOUSEWARES

National Housewares Manufacturers Association's Exhibit, Navy Pier and Drill Hall, Chicago, January 11-15, 1960.

ENAMELERS

Midwest Enamelers Club Meeting, Sheraton Towers Hotel, Chicago, January 16, 1960.

HOME BUILDERS

National Association of Home Builders Annual Convention and Exhibition, Chicago, January 17-21, 1960.

METALLURGY

The Metallurgical Society of the American Institute of Mining, Metallurgical, and Petroleum Engineers' Conference, Del Prado Hotel, Chicago, January 20, 1960.

MAINTENANCE & ENGINEERING

Plant Maintenance & Engineering Show, Convention Hall, Philadelphia, January 25-28, 1960.

ELECTRIC HOUSE HEATING

First National Electric House Heating Exposition, Sponsored by the Electric House Heating Equipment Section of the National Electrical Manufacturers' Association, Hotel Sherman, Chicago, March 21-23, 1960.

BUILDING RESEARCH

Building Research Institute's Spring Conferences, Statler-Hilton Hotel, New York, N. Y., April 5-7, 1960.

AUTOMATIC TECHNIQUES

Third Annual Conference on Automatic Techniques, Cleveland-Sheraton Hotel, Cleveland, Ohio, April 18-19, 1960.

TOOL ENGINEERS

American Society of Tool Engineers Tool Show and Annual Convention (Tool Show, Artillery Armory; Technical Sessions, Sheraton-Cadillac Hotel and Artillery Armory) Detroit, Mich., April 21-28, 1960.

WELDING

The American Welding Society's 41st Annual Convention and Welding Exposition, Los Angeles, Calif., April 25-29, 1960. (Technical Meetings, Biltmore Hotel, April 25-29; Welding Show, Great Western Exhibit Center, April 26-28).

AIR CONDITIONING

The Air Conditioning Industries Association's Western Air Conditioning, Heating, Ventilating, and Refrigeration Exhibit and Conference, Shrine Exposition Hall, Los Angeles, Calif., April 27-30, 1960.

WHITER THAN NATURE'S WHITEST

PORCELAIN ENAMEL

FRIT

If a fresh snowfall is your idea of whiteness, Hommel Tite-Wite is whiter than white . . . dazzling in its purity. With Hommel Tite-Wite, color uniformity is assured. Every bag is quality-controlled, your guarantee of a perfect application every time.

The secret of Hommel whiteness is quality raw materials and pioneering research. This unbeatable team also gives you these added advantages: lower production costs, versatility for drain, dip or spray application, permanent alkali and acid resistance, improved scratch and thermal shock resistance. Let your local Hommel representative show how Hommel research works for you.

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If your production justifies it, install a Bonderite line; if you don't want to make the investment right now, specify BONDERIZED and painted stock from your supplier.

Bonderite on aluminum adds tremendously to the appearance and performance life of the paint finish. Paint is anchored so securely that stamped and roll formed products may be fabricated without chipping or peeling of the paint film or any loss of adhesion, even after most severe deformation.

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2. Positive corrosion control.
3. Increased paint durability.

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Bonderite for aluminum meets and exceeds the requirements of Government Specification MIL-C-5541.

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PARKER RUST PROOF COMPANY

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BONDERITE corrosion resistant paint base | BONDERITE and BONDERLUBE aids in cold forming of metals | PARCO COMPOUND rust resistant | PARCO LUBRITE—wear resistant for friction surfaces | TROPICAL—heavy duty maintenance paints since 1883

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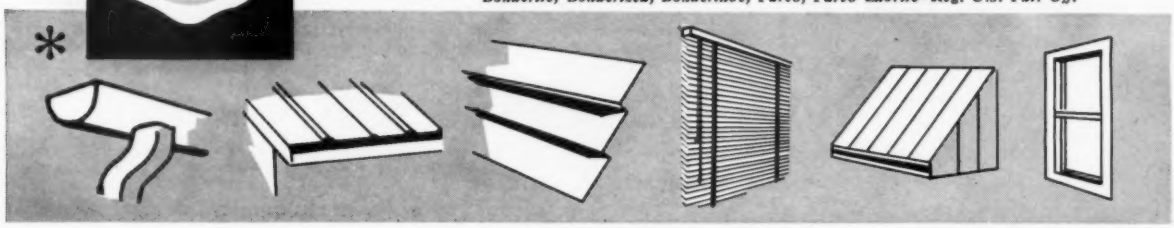

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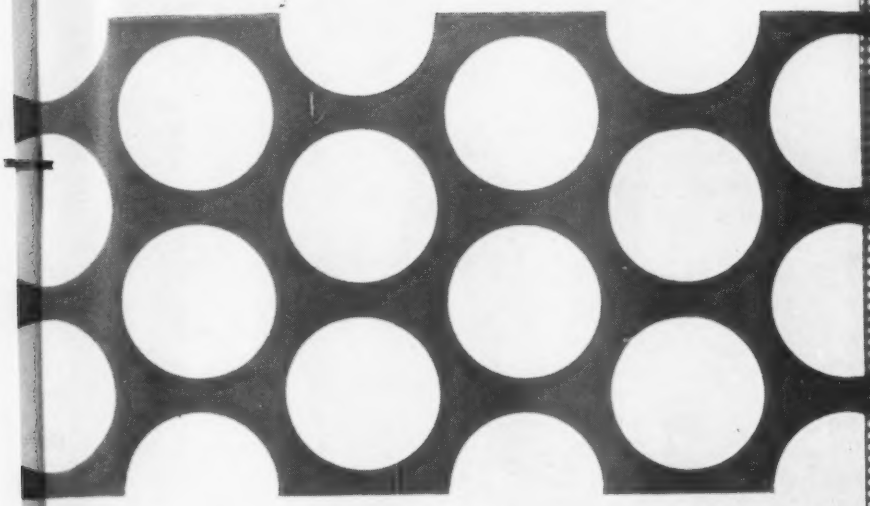
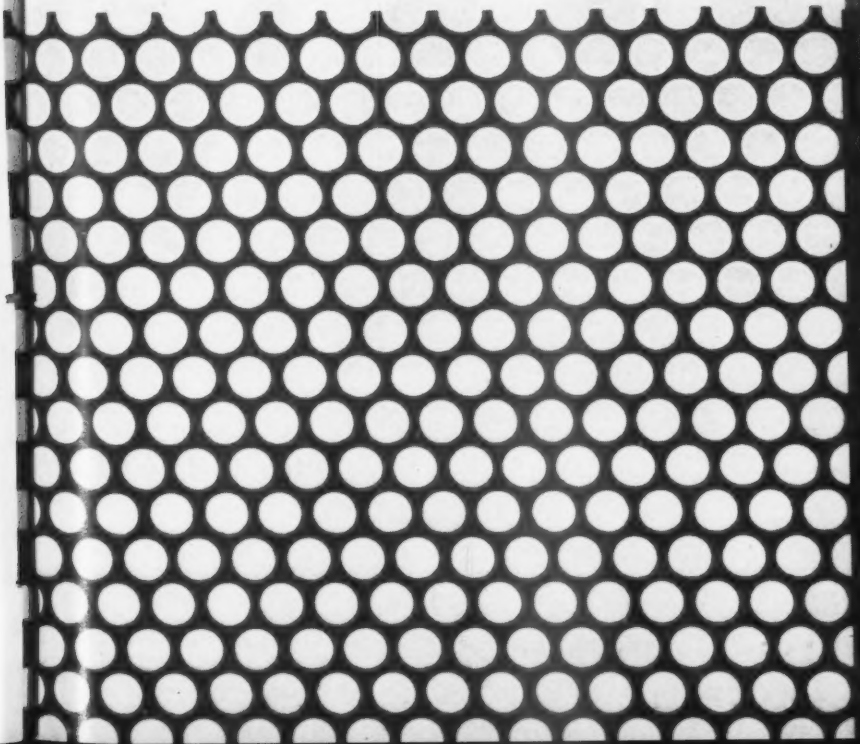
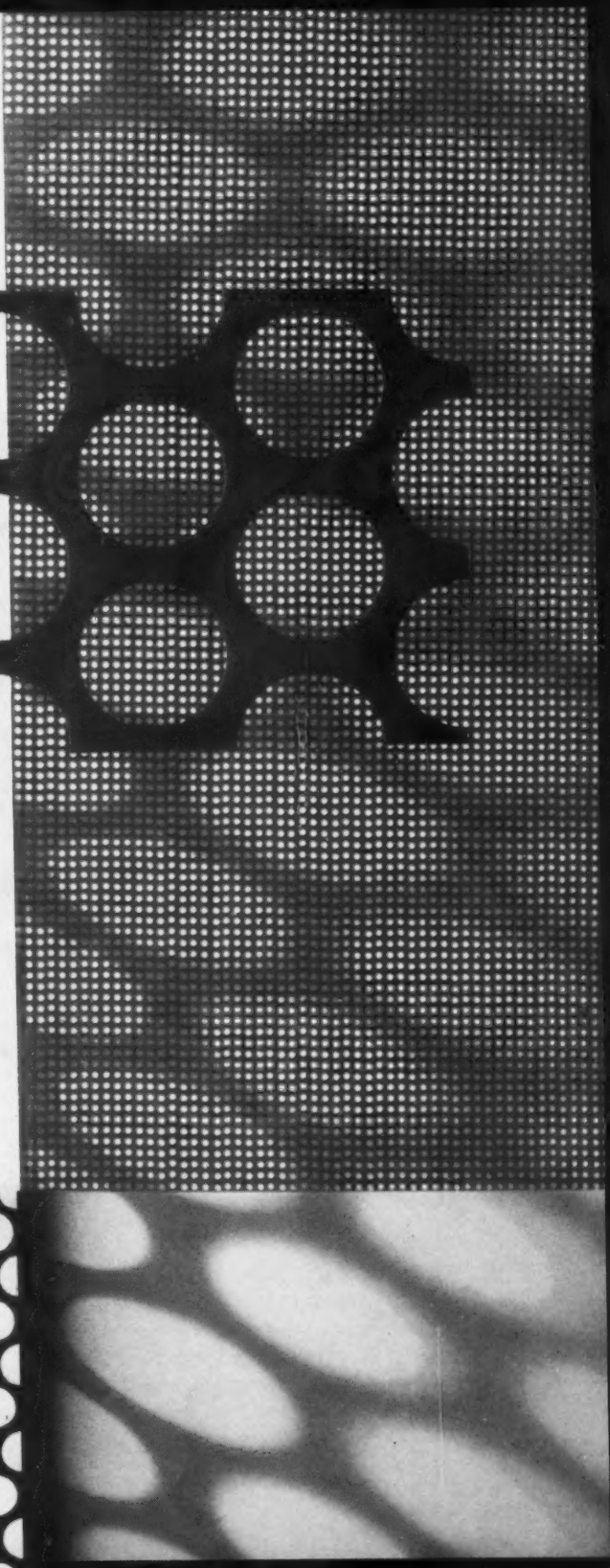


suppliers of quality
perforated materials
to American industry
since 1883





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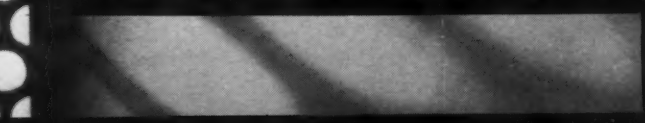
5640 Fillmore Street
Chicago 44, Illinois

New York Office and Warehouse
116 Liberty Street
New York 6, New York



NEW

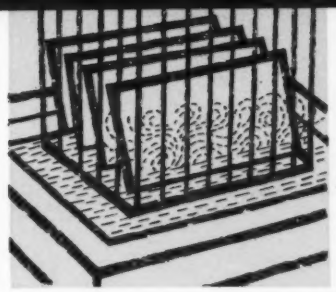
PRODUCT NEWS FROM *Pfizer*

NOW!

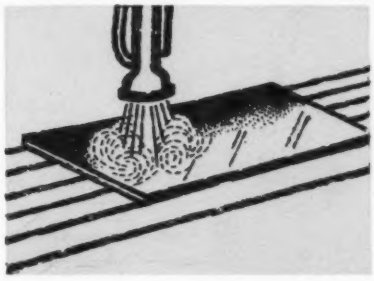
Manufacturing Chemist

Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N. Y. **Chemical Sales Division,** Branch Offices: Clifton, N. J.; Chicago, Ill.; San Francisco, Calif.; Ver

1 **Pickle in citric bath**



2 **Apply cover coat frit directly.**



3 **Fire in existing equipment.**

PRACTICAL DIRECT-ON PORCELAIN ENAMELING WITH PFIZER CITRIC ACID

It's simple. The secret of really practical *direct-on* porcelain enameling is using a *citric acid* solution as your pickling bath. And *direct-on* porcelain enameling means you can double your oven capacity, cut your handling and obtain a better, more flexible porcelain coating. Bond and finish characteristics are excellent.

In this new Ray-Davis* process, only cover coat enamel is required. The ground coat step is completely eliminated. No special handling technique or major installation of equipment is required.

Mail in the coupon below for complete technical information on this important new porcelain enameling development.

Important advantages of the Ray-Davis Direct-On process

- No special handling of pickled steel is required.
- No major installation of special equipment necessary.
- Uses non-premium type steels.
- Easy to handle—citric is a dry, non-toxic, water soluble acid.
- Only one application of frit.
- Doubles oven capacity.

***Developed by W. G. Ray, Chas. Pfizer & Co. and Shipp C. Davis, Daco Corp.**

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Pfizer

Science for the world's well-being

Calif.; Verm Atlanta, Ga.; Dallas, Tex.; Montreal, Can.

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CHAS. PFIZER & CO., INC. CHEMICAL SALES DIVISION
630 Flushing Avenue, Brooklyn 6, N. Y.

Please send me: ☐ Technical Information
☐ Sample of steel porcelainized by Ray-Davis process

Name_____

Company_____

Address_____

City_____ State_____

First Western Appliance Technical Conference

T. T. Woodson, chairman.

AN MPM STAFF REPORT

THE FIRST WESTERN APPLIANCE Technical Conference sponsored by a sub-committee of the American Institute of Electrical Engineers was held in the Biltmore Hotel in Los Angeles on November 16. Approximately 115 engineers, designers, executives, and sales people representing all phases of the appliance industry attended, along with many representatives of the various utility companies which serve the appliance industry. The concensus of opinion was that the success of this meeting would lead to many more of its type in the Western area.

T. T. Woodson, Waste King Corp., Los Angeles, was presiding chairman at both the morning and afternoon sessions. W. E. Cranston, president, Norris-Thermador Corp., Los Angeles, delivered the keynote address.

In his talk, Cranston probed directly into various troubles and dangers associated with the manufacture and marketing of all types of appliances. He stated that what the industry needed most was some original thinking. To emphasize this point, he pointed out that, while all appliances looked alike, women were *not* all of the same height.

Danger in buying appliance components on price

Cranston also emphasized the danger of using cheap components. Price should be given less consideration, he said. Components which fail quickly because of lack of quality naturally result in more customer service calls and the creation of customer ill will. The Norris-Thermador president pointed out that the appliance industry is competing with all industry for the consumer dollar, and should conduct itself accordingly.

B. M. Osborne, Southern California Edison Company consulting engineer, substituting for John Lieberman, Ranco Inc., delivered a very interesting paper on heat pumps. Osborne pointed out that successful use of the heat pump stemmed from the design of an instant reversing valve. These valves have been in use for three years now, and it is during that period that heat pumps have become popular.

Heat pumps, Osborne said, provide fully automatic heating and cooling. They are mostly trouble-free, and require a minimum of servicing. There are now between 10 and 15 thousand heat pumps in the Southern California area, with approximately 20 per cent of them in homes. Cost of a heat pump installation, Osborne pointed out, runs between $.90 and $1.00 per residential square foot.

Electrical controls for gas ranges

G. F. Moore, O'Keefe & Merritt Co., Los Angeles, delivered a paper entitled "Electrical Systems and Problems on Gas Appliances." In this paper, Moore described the uses of electrical controls on gas ranges and the functions of each. He pointed out that most of the electrical controls were employed to maintain constant heat. He explained some of the problems of layout as they were affected by the difference in regulations and codes found in different localities.

J. C. Burdett, Westinghouse Electric Corp., Lima, Ohio, delivered a comprehensive paper of the testing of small motors for appliance installation. He explained the necessity of matching motors to load requirements, and told how this could be accomplished by using a single standard test motor. He emphasized the need of appliance standards to aid the motor manufacturers in supplying an optimum product. These standards should specify the minimum temperature and minimum voltage at which an appliance was supposed to operate at acceptable efficiency.

W. R. Crawford, Whirlpool Corp., St. Joseph, Mich., discussed the design of appliance conductors and connections. He pointed out that many problems could accrue from these sources. The deterioration of insulation becomes very rapid at excessive temperatures, he said, and conductor migration in a thermoplastic cord is very liable to occur. He explained that re-current heat and cooling could cause the loosening of a connection with consequent current loss.

The meaning of service

In his paper, "Service, What it Means," H. M. Johnson, supervisor,

Morning speakers at the conference were (from left): B. M. Osborne, Southern California Edison Co., substituting for John Lieberman, Ranco, Inc.; J. C. Burdett, Westinghouse Electric Corp.; T. T. Woodson, Waste King Corp., chairman; W. E. Cranston, Norris-Thermador Corp.; and G. F. Moore, O'Keefe & Merritt Co.

EXCLUSIVE MPM PHOTOS

Appliance Servicing, Southern California Edison Co., gave a broader meaning to the word "service" by pointing out that it meant far more than merely placing an appliance back in operating condition. It can and does mean keeping faith with the customer, he said. From the standpoint of the appliance manufacturer, Johnson pointed out the importance of ease of serviceability, and reactions of the customer when an appliance has to be virtually dismantled to install a simple part. Standardization of service parts and proper instruction manuals would greatly simplify the service problem, Johnson said.

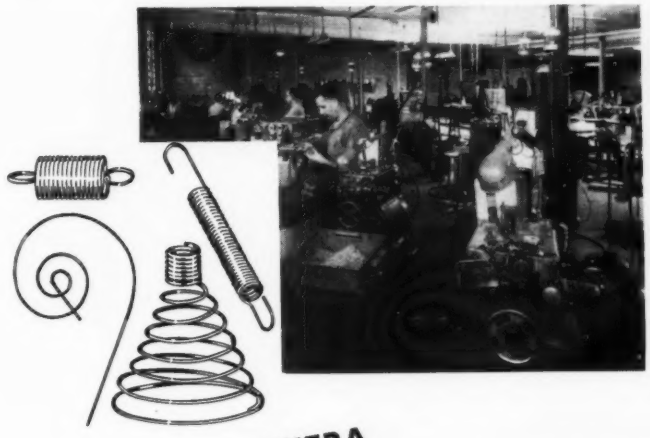
Utility man offers advice to appliance engineers

Monte R. Mosquini, senior distribution engineer for Southern California Edison Co., told how that utility was endeavoring to deliver a constant supply voltage to the customer's meter, and of the utility's campaign to make customers increasingly aware of the importance of proper house wiring to secure proper voltage at the point of use. He described also what appliance design engineers could do to minimize voltage drop when the appliance is placed in service — particularly appliances employing large motors.

In the final paper of the day, W. F. Lovelace, manager, Residential Sales, General Sales Division of Department of Water and Power, City of Los Angeles, discussed the subject, "The What and Why of Utility Appliance Specifications." Lovelace described the specifications an appliance should meet if it is to be recommended to a customer by a utility. Lovelace said that, because electricity is the only product electric utilities have for sale, it is to their interest to promote the sale of electrical appliances. However, he pointed out, only high quality products meeting rigid specifications could be conscientiously recommended to the utility customer.

The Technical Conference ended in an open panel discussion, without papers, but with questions flowing freely and answers as freely given. Some of these questions were generated by the papers of the day; others had obviously been brought to the conference.

In feeling the pulse of those who attended the conference after it was over, this writer was assured that those attending were satisfied with the meeting program and the way in which the business had been conducted. All were certain that this First Western Appliance Technical Conference was only one of many to follow.



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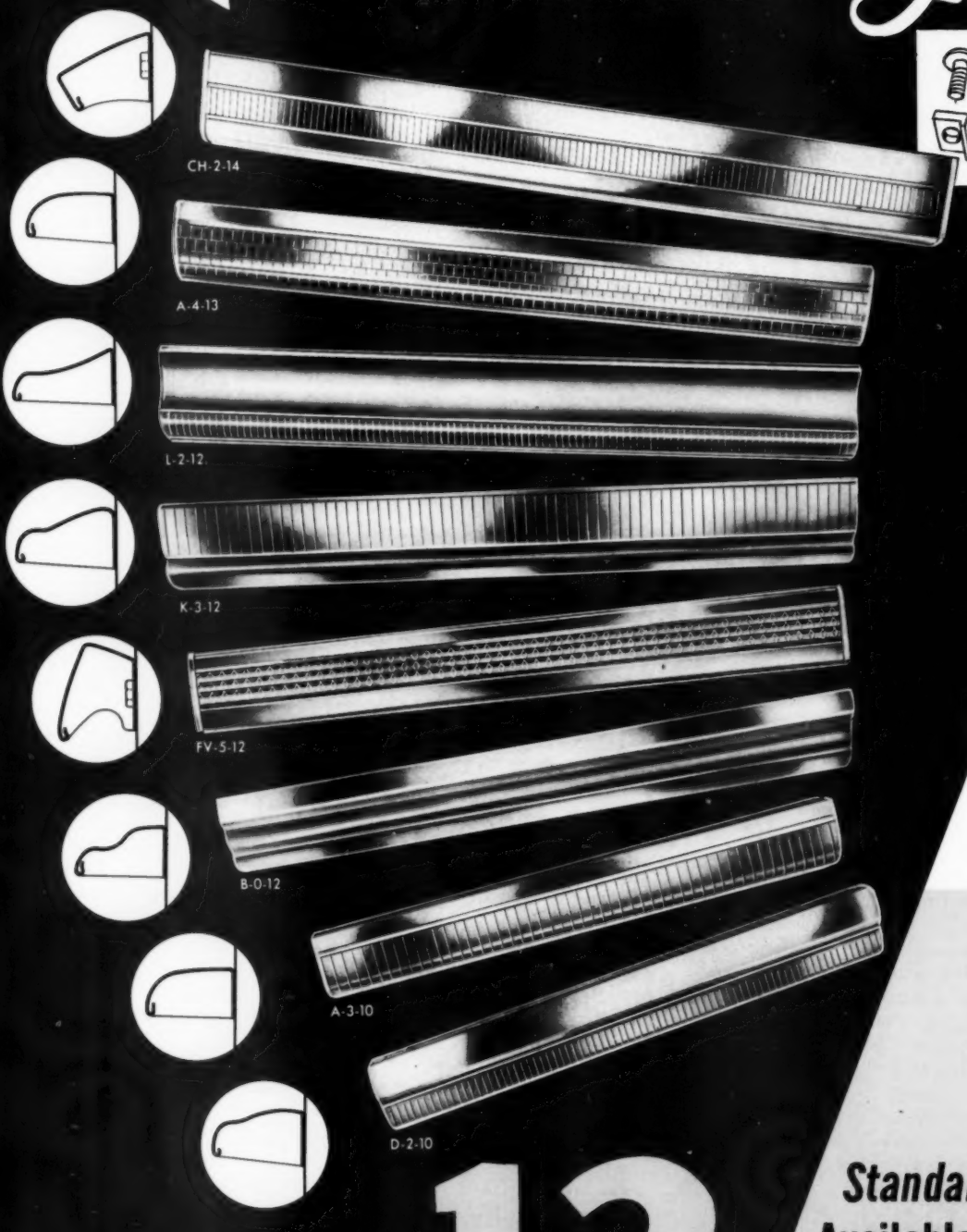

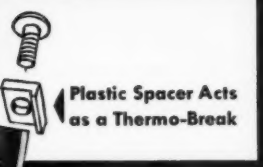

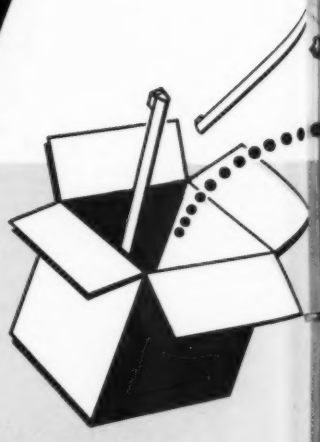

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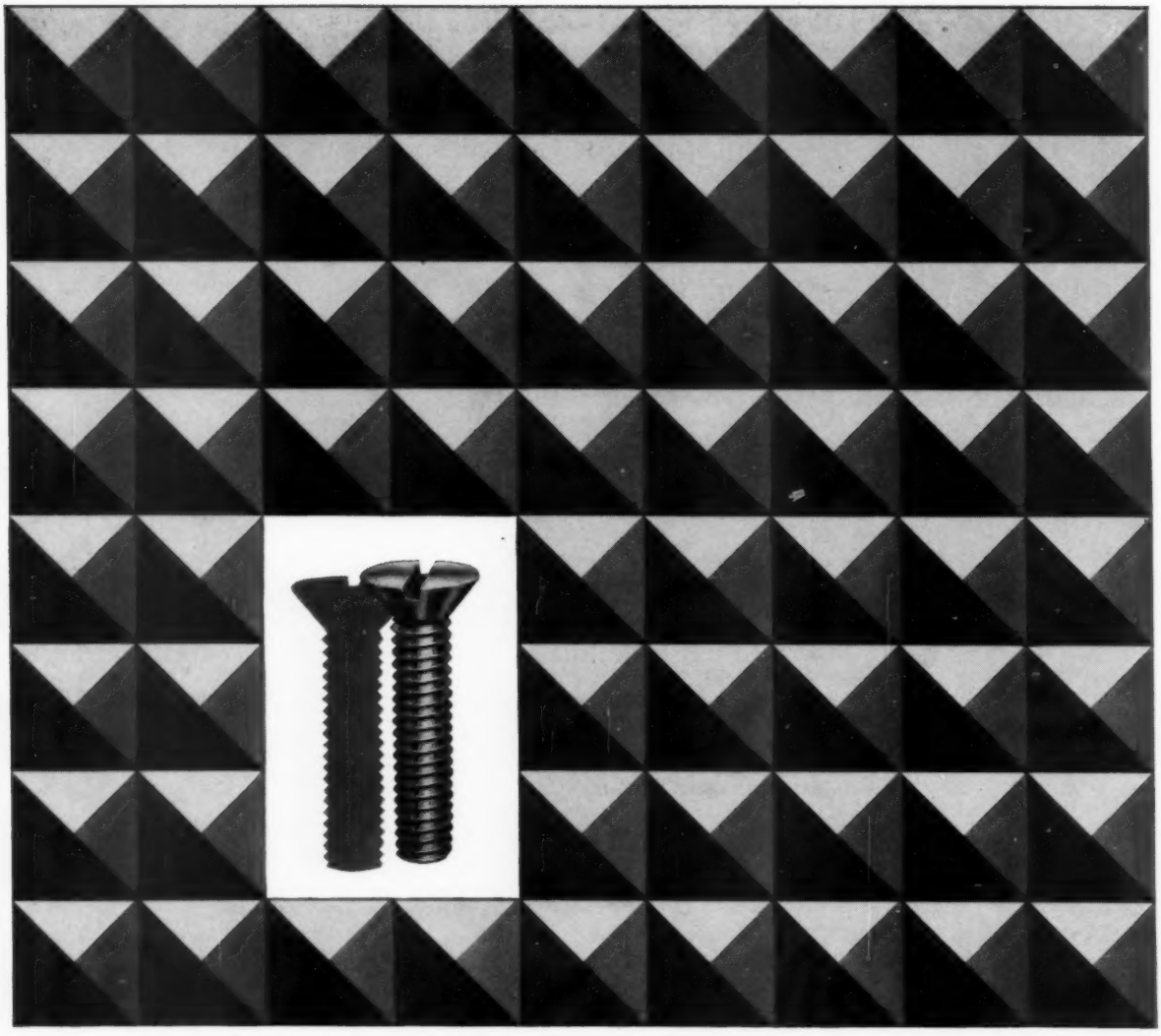

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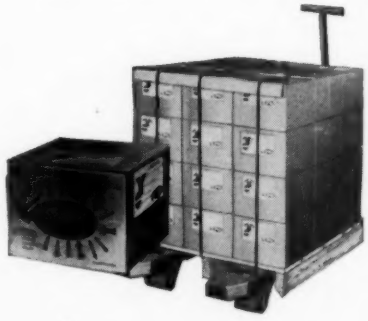

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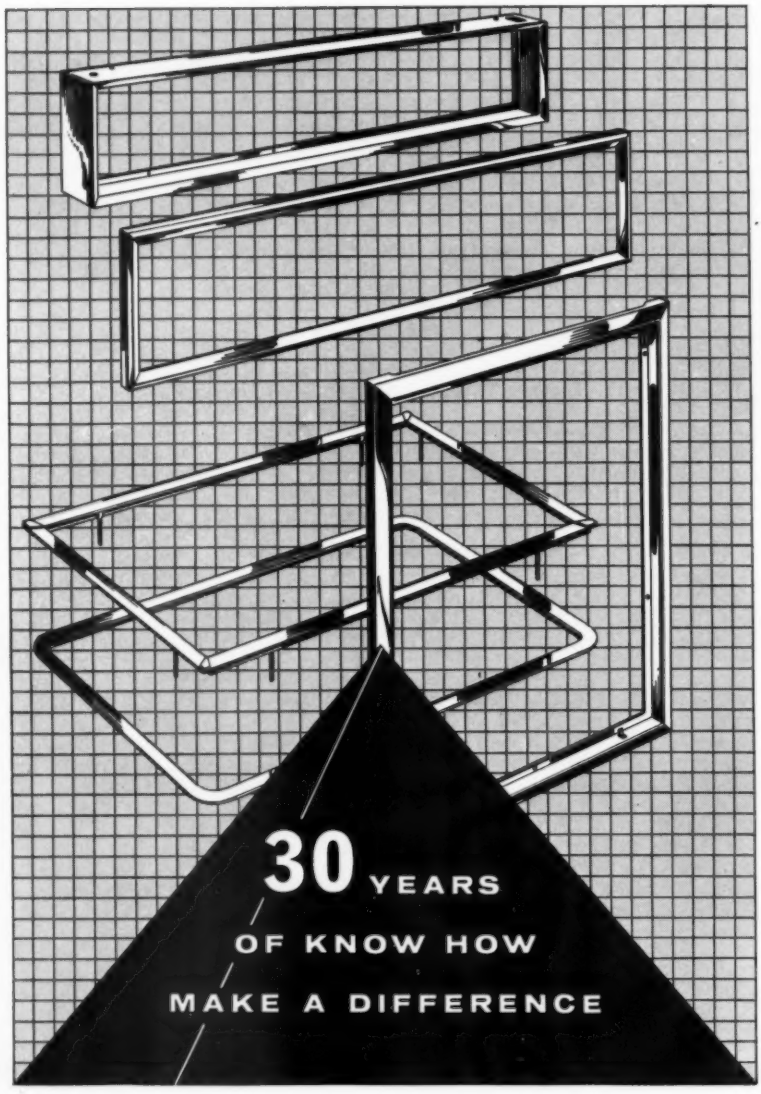

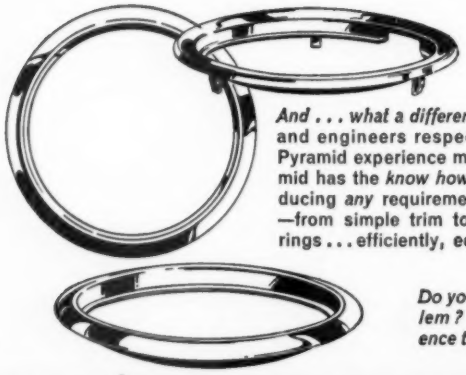

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from the Editor's Mail

Product and production design

Gentlemen: In my present capacity as supervisor of product and production design, I have found your publication extremely informative and helpful towards the execution of my daily responsibilities. So that I might derive additional benefits from your articles and features, I would appreciate receiving your magazine at my home, 124 Holly Drive, Wood's Edge, Hatboro, Pa. If this can be arranged, I would be most appreciative.

John A. Heyer
Chief Product Designer
Kaiser Metal Products Co.
Bristol, Pa.

In pursuit of business

Gentlemen: We would appreciate your sending a copy of the 1959 special section devoted to the manufacture of vending machines.

We are present subscribers to your METAL PRODUCTS MANUFACTURING publication, and find a great deal of information contained within to assist us in the pursuit of our business.

Ralph C. Deuster
Industrial Sales Dept.
West Bend Aluminum Co.
West Bend, Wis.

Fabricating supervision

Gentlemen: In my position at Sears, I have supervision over certain metal fabricating operations. I would appreciate being included in your free controlled circulation list for your publication METAL PRODUCTS MANUFACTURING.

C. E. McKay, Factory Management
Sears, Roebuck and Co., Chicago

As a representative of a company important in the appliance field, Mr. McKay will receive his personal copy.

Sears library copy readers 22

Gentlemen: We are on your mailing list to receive one copy of your publication METAL PRODUCTS MANUFACTURING each month.

Is there any possibility of your sending us two copies every month. The copy we now receive is circulated to 22 individuals throughout our organization so consequently is never available for reference.

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Virginia Pearson, Librarian
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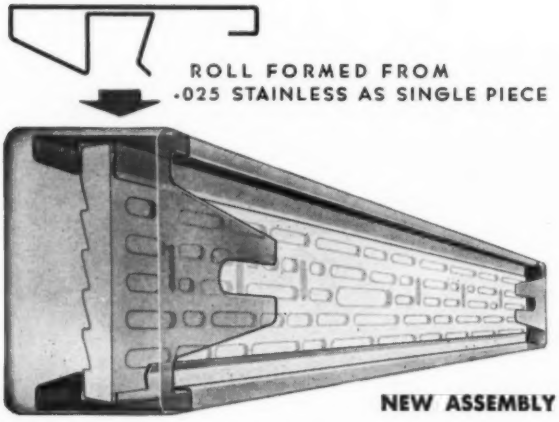

NEW ASSEMBLY

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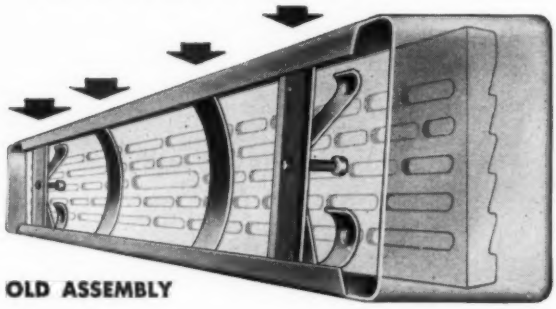

OLD ASSEMBLY

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An expensive stamping and six clips went into this assembly. The stamping had a bad finish and cracked. Now it's Roll Formed from stainless. The finish is bright, shining and can't stain in use. Cracks are eliminated.

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opinions from individual end product manufacturers

AN ANNUAL MPM SERVICE FEATURE

The outlook for the gas appliance industry

manufacturers and professional statisticians agree on future outlook

by Edward R. Martin • DIRECTOR, MARKETING AND STATISTICS, GAS APPLIANCE MANUFACTURERS ASSOCIATION

THE GAS APPLIANCE and equipment industry in 1959 — Despite the steel strike and its effect upon last-quarter sales, practically all branches of the industry attained sales volumes greater than during the previous year. Gas range sales again went over the 2 million unit mark; automatic gas water heater sales exceeded 3 million units; and gas central heating equipment sales approximated 1,400,000 units. Sales of vented recessed wall heaters and floor furnaces (combined), direct heating equipment, unit heaters and duct furnaces, and commercial gas ranges were also above the levels of 1958.

Built-ins may lead the pack

The gas appliance and equipment manufacturers' opinions as to 1960 sales volumes are in tune with both the current economy and the trends which their sales have been following over the past several years.

In the residential gas appliance and equipment field, many new sales peaks were attained during the year just passed. Sales of built-in ranges, furnaces, boilers, and automatic water heaters established "alltime" records. Thus, it becomes basically significant that even slight increases in many categories presage new sales peaks in the year ahead.

Gas-fired furnace manufacturers expect 1960 sales to total 1,104,500 units, 0.5 per cent ahead of last year.

Gas boiler manufacturers look for industry sales of 142,400 units, a 3.3-per cent increase over the sales of 1959.

Automatic gas water heater sales, which are strongly influenced by the

ANTICIPATED 1960 INDUSTRY UNIT SALES

	SALES IN UNITS			Anticipated % Change as of June, 1959
	1960 (Consensus)	1959 (Estimated*)	Percent Change	
Domestic Gas Ranges				
Free Standing	1,713,900	1,723,700	— 0.6	+ 2.4
Built-Ins (oven-broiler units)	431,300	361,400	+19.3	+17.3
Total	2,145,200	2,085,100	+ 2.9	+ 4.9
Automatic Gas Water Heaters	3,012,500	3,016,000	— 0.1	+ 1.5
Gas Central Heating Equipment				
Warm-Air Furnaces	1,104,500	1,099,200	+ 0.5	+ 5.2
Boilers	142,400	137,900	+ 3.3	+ 5.5
Conversion Burners	141,900	153,200	— 7.4	— 4.5
Total	1,388,800	1,390,300	— 0.1	+ 4.4
Gas Vented Recessed Wall Heaters	452,600	459,300	— 1.5	+ 3.2
Gas Floor Furnaces	86,000	99,300	—13.4	— 8.4
Gas Direct Heating Equipment	1,482,800	1,465,900	+ 1.2	+ 7.6
Gas Incinerators	52,800	48,700	+ 8.4	+ 9.7
Gas Unit Heaters	141,100	136,800	+ 3.1	+ 5.2
Gas Duct Furnaces	25,500	24,100	+ 5.8	+ 9.2
Commercial Gas Ranges	33,700	33,200	+ 1.5	— 5.6

* Ten months actual, two months estimated.

installation of gas househeating equipment, may increase in 1960 to 3,012,500, basically unchanged from the 3,016,000 units sold in the previous year.

Built-in gas ranges, which strengthened their position during the past year, can anticipate sales of 431,300 units for the coming year, an increase of 19.3 per cent.

Of prime importance is the fact that the above-noted products are closely allied with new home construction. While these anticipated sales gains in 1960 are moderate, or very slightly below last year's attainments, new dwelling unit starts are expected to decline. Thus, the trends of the recent past are expected to continue with gas equipment taking a somewhat larger share of the new home market.

Year 1960 estimated at 0.7 per cent ahead of 1959

The gas appliance and equipment industry in 1960—In June of 1959, manufacturers felt that the 1960 sales of all gas appliances and equipment would exceed the current year's sales by 3.8 per cent. Their present thinking, which reflects the feeling of industry in general, is that overall sales increases will be somewhat less than anticipated and that 1960 will exceed 1959 by 0.7 per cent.

The table shown on page 21 compares current anticipated 1960 sales volumes with the estimates for 1959 unit sales. The last column presents the percentage increases which were anticipated (1960 over 1959) in June of 1959.

It is significant that this current "general business outlook," which presents the consensus of what industry thinks 1960 sales will be, ties in very closely with the statistical forecasts made by gas water heater and domestic gas range manufacturers. For example, this consensus indicates anticipated automatic water heater sales of 3,012,500 units in 1960. The average of "professional-type" forecast studies, conducted quarterly by GAMA, is that 2,987,200 automatic gas water heaters will be sold this year.

Similarly, this consensus study anticipates sales of 2,145,200 domestic gas ranges during the coming year, while the average of the "professional" forecasts is 2,186,000 units.

Domestic gas ranges

Manufacturers expect total industry sales volumes to approximate 2,145,200 units during 1960, an increase of 2.9 per cent over 1959 volumes. "Built-in" gas range sales are expected to reach a total of 431,300 units, or 19.3 per cent more than were sold during the preceding year. "Free-standing" range sales are expected to decrease 0.6 per cent from 1959 levels and approximate 1,713,900 units.

The figures in the foregoing paragraph are based upon analysis of replies received and are indicative of what manufacturers think industry volumes will be during the coming year. It is equally interesting to study expected industry volumes from the viewpoint of what each individual reporting company expects to accomplish.

Free-Standing Ranges — Of the 18 manufacturers submitting their estimates, 12 expect their own sales volumes to exceed the volumes of 1959. Five manufacturers anticipate lesser volumes, and one expects no change.

Built-In Gas Ranges — All of the 16 participating manufacturers feel their 1960 volumes will increase.

Central heating equipment

Manufacturers of gas-fired central heating equipment (warm-air furnaces, boilers, and conversion burners combined) expect 1960 industry shipments to be basically unchanged from 1959 shipments. The consensus is that 1960 shipments will approximate 1,388,800 units, 0.1 per cent below 1959 levels.

Warm-air furnace manufacturers look for increased volumes during 1960. The consensus, sales of 1,104,500 units, or 0.5 per cent greater than during the previous year.

Gas boiler manufacturers also look for increased volumes during 1960, with sales totaling 142,400 units, an increase of 3.3 per cent over 1959 volumes.

Gas conversion burner manufacturers expect industry sales to decrease by 7.4 per cent from 1959 volumes and approximate 141,900 units.

Of the 49 warm-air furnace manufacturers reporting, 42 expect their companies to do increased volumes during the coming year, five expect a decrease in their sales, while two feel there will be no change.

Automatic water heaters

Automatic gas water heater manufacturers look for basically-unchanged sales volumes during 1960. The consensus is that sales will decline 0.1 per cent and approximate 3,012,500 units.

Of the 25 manufacturers submitting their estimates, twenty expect their own volumes to exceed the volumes of 1959, three look for a decline, and two did not furnish an estimate.

Therefore, an analysis indicates that sales of automatic gas water heaters could increase as much as 4.6 per cent to a total of 3,154,700 units.

Direct heating equipment

Manufacturers of *gas-fired direct heating equipment* expect an increase of 1.2 per cent from 1959 sales and to approximate 1,482,800 units. Of the 11 manufacturers submitting their estimates, eight expect their own sales volumes to exceed the volumes of 1959, and two expect sales to remain the same. One manufacturer did not provide an estimate. Therefore, sales of gas-fired direct heating equipment, during 1960, could total 1,565,600 units, or 6.8 per cent above 1959 levels.

Gas-fired unit heater manufacturers look for increased volumes during 1960. The consensus, sales of 141,100 units, or 3.1 per cent greater than in 1959. Seventeen of the 19 responding manufacturers anticipate their own companies' sales will increase, while one expects his sales to remain the same, and one expects lesser volumes.

Gas-fired duct furnace manufacturers anticipate sales increases for 1960 with industry volumes totaling 25,500 units, or 5.8 per cent above the volumes of 1959. Ten of 16 responding companies look for an increase in their 1960 sales, two expect their sales to remain unchanged, and one company expects his sales to decline. Three companies did not provide an estimate.

Wall heaters and floor furnaces

Manufacturers of gas-fired vented recessed wall heaters expect total industry sales volumes to approximate 452,600 units during 1960, a decrease of 1.5 per cent from 1959 volumes. Gas floor furnace sales are expected to decrease 13.4 per cent from 1959 levels and approximate 86,000 units.

Vented recessed wall heaters — Of the 17 manufacturers reporting, 12 feel their own company sales will increase during the coming year. Four companies anticipate a decrease, and one did not provide an estimate. With all companies performing up to expectations, sales could increase by 3.6 per cent to 475,800 units.

Gas floor furnaces — Five of ten reporting companies expect to do increased business, while three think their 1960 sales will fall below those of 1959. One expects no change in company volume, and one provided no estimate. On this basis, floor furnace sales could reach 105,000 units.

Incinerators and commercial ranges

Gas-fired incinerator manufacturers expect an increase of 8.4 per cent from 1959 sales and to approximate sales of 52,800 units. Of the ten manufacturers submitting their estimates, nine expect their own sales volumes to exceed the volumes of 1959. One manufacturer anticipates his sales to remain the same.

Gas-fired commercial range manufacturers look for increased volumes during 1960. The consensus, sales of 33,700 units, or 1.5 per cent greater than in 1959. Seven of the ten responding manufacturers anticipate an increase, one expects a decrease, and two look for no change.

Air conditioning and refrigeration industry

a record-breaking decade is foreseen for air-conditioning and refrigeration

by George S. Jones, Jr. • MANAGING DIRECTOR, AIR-CONDITIONING AND REFRIGERATION INSTITUTE

THE AIR-CONDITIONING and refrigeration industry has had the best year in its relatively-short history in 1959, and 1960 promises to break all records for the sale of all types and sizes of equipment using the "mechanical refrigeration" cycle.

At the 11th Exposition of the industry, held at Atlantic City, N. J., in November, the almost-200 exhibitors were virtually unanimous in expressing the belief that the comeback made by the industry in 1959, after two years when the sales curve was considerably flatter than in the preceding decade, presages a record-breaking 1960 and continued progress through the '60's.

The growth trend already shown is enough to convince industry observers that 1959 sales of all products in our field will run as much as 20 per cent ahead of 1958, and 10 to 15 per cent ahead of the best previous year — 1956.

Manufacturers' shipments of compressors, the heart of any mechanical refrigeration or air-conditioning system, and thus always a good indicator of industry activity, were running about 40 per cent ahead of 1958 for the first three quarters of the year. However, we are not forecasting that sales of all end products will reflect the gain to this degree, since manufacturers order these components months ahead of actual production and sale of consumer goods.

Big gains for unitary air conditioners and heat pumps

At the same time, sales of unitary air-conditioners probably will show almost this large a gain over 1958, based on figures for the first nine months of the year, and a total shipment figure of 320,000 units being estimated, compared with 231,000 in 1958. "Unitary" equipment includes all central residential installations, and many similar commercial and industrial ("packaged") applications. Central residential installations have, over the years, accounted for more than 60 per cent of unitary sales, so, following out the trend, the Institute estimates that some 200,000 U. S. homes have been centrally air-conditioned this year. This is more than double the home installations in 1954, five short years ago.

Interestingly, gains made by the heat pump are even greater than those indicated for unitary cooling equipment overall. Preliminary figures show that almost 40,000 unitary heat pumps will be shipped by manufacturers in 1959, compared with about 25,000 in 1958, and fewer than 2,000 in 1954.

Big systems show gains also

Aside from central residential air-conditioning, in which perhaps the most spectacular gains for 1959 will be shown when the final figures are in, the installation of big "systems" for the cooling of office buildings, apartments and hotels, industrial plants, and similar large structures has continued its upward trend in 1959, although perhaps not so sharply as in the smaller units.

Early estimates are that installed value of such systems in 1959 will be more than $600 million, a gain of about 10 per cent from the figure of $550 million in 1958, and almost 60 per cent over the five-years-ago (1954) installed value of $379 million. These figures represent "equipment in place," rather than the value of manufacturers' shipments, and include cost of installation, ductwork, grilles, and other elements that go to make up the system. Since components for these systems may be shipped from a number of sources, and some of the elements may not be specifically tagged for the type of installation for which finally intended, it is virtually impossible to arrive at a figure for shipments of the elements themselves, in terms of units; hence the practice of using the "installed value" figure.

Only about 10 to 15 per cent of U. S. factories are air-conditioned, but industrial management is coming to recognize more acutely each year the economic benefits of industrial air-conditioning through improved employee health and morale, lower rates of absenteeism, increased efficiency and greater production. Hence, the outlook for continued gains in this field supports the overall optimistic forecast for 1960 and succeeding years.

Of no small importance in the consideration of air-conditioning systems for large installations such as office buildings is the fact that the General Services Aministration of the federal government published results of a study during 1959 which showed that efficiency of office workers under controlled conditions of temperature and humidity was at least nine per cent greater in air-conditioned than in non-air-conditioned spaces.

Automotive air-conditioning to reach 25 per cent of production

Another area in which air-conditioning is gaining by leaps and bounds is the automobile-cooling field. Statistics are not available, but it is known that all major motor manufacturers have stepped up the percentage of their automobiles which are leaving the factory completely air-conditioned (even in the lower-priced models), and the production of units for field installation has shown a similar growth which may be expected to continue and become greater in degree as more and more cars are air-conditioned.

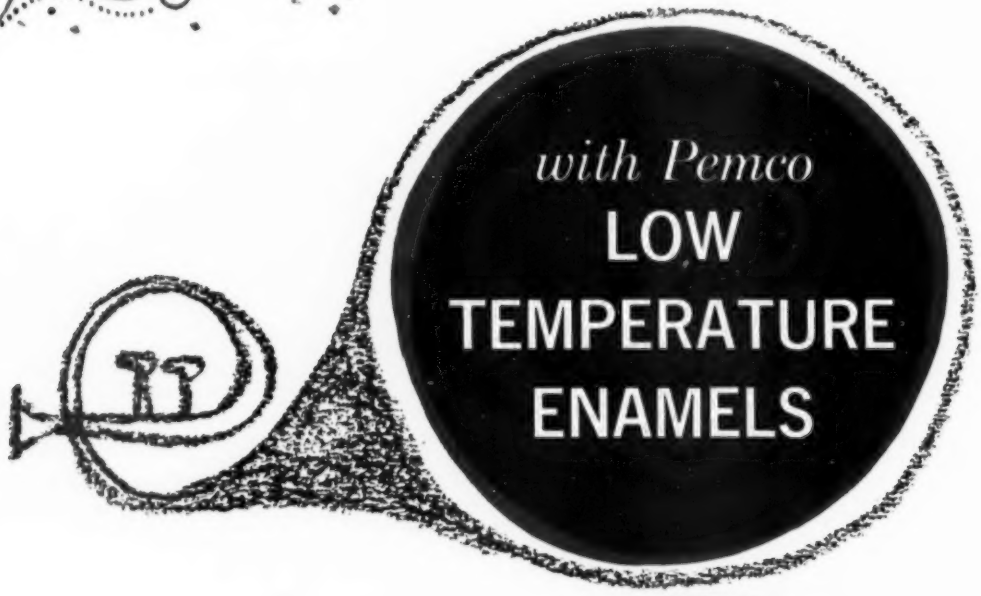
The Society of Automotive Engineers has estimated that by 1962 one in nine cars will be air-conditioned, and 25 per cent of all cars produced within five years will be factory-equipped with air-conditioning.

Great fortune for commercial refrigeration

In the field of commercial and industrial refrigeration, the longer-established phase of mechanical cooling, 1959 has been an excellent year for most of the many products covered in this broad category, and forecasts of increased marketing facilities for foods (75 per cent of which are mechanically cooled at some point along the pipeline from producer and processor to consumer), as well as building outlook and developments in scientific and defense applications, augur well for a further step-up in utilization of refrigeration.

Typical of the forecasts that lead manufacturers of refrigeration equipment to look to the future with optimism is the outlook for the frozen food industry, as expressed by Harold J. Humphrey, president of the National Association of Frozen Food Packers. Citing the growth of frozen foods as a factor in American life, Humphrey pre-

GET ON THE BANDWAGON...



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dicted that "in the next three to four years, total frozen food production should be between 8.5 and 9 billion pounds, an increase of 1.5 to 2 billion pounds" over production this year . . . "I think you can see the pressing need for adequate refrigeration." This new equipment will be needed, he pointed out, "particularly for trucks, backroom storage in retail stores, retail cabinets and, of course, home refrigeration."

This is only a brief summary of the many factors behind our industry's belief that "the 60's," beginning this year, will bring a continued growth in demand for its products. Our manufacturers will do their best not only to keep up with the demand, but will continue to develop and improve the equipment that contributes so greatly to our nation's health, happiness, production.

Automatic merchandising in the 60's

a forecast by four industry leaders

THE AUTOMATIC VENDING MACHINES of the 1960's will be as different as today's machine is from the simple models which launched the automatic merchandising industry as a major marketing method in the years after World War I.

And so will the variety of new products and services which the American public can expect from the silent salesman in the years ahead.

This prediction is the result of a look into the 60's by four experts of automatic merchandising.

"Buying a cup of coffee from a vending machine was impossible in 1945," says DOUGLAS MOORE, vice president of DAVIDSON AUTOMATIC MERCHANDISING CO., Los Angeles. There weren't any such machines.

"If this seems incredible today, it is a good example of what we can expect from the versatile vending machine in the next decade," he adds.

The growing utilization of automatic cafeterias in the feeding of employees, students, and others is predicted by AARON GOLDMAN, president of THE G. B. MACKE CORP., Washington, D. C.

"Automatic cafeterias can already vend about 90 per cent of the kinds of foods which most workers want for their meal 'away from home,' and they do it efficiently and in a most sanitary manner," Goldman says.

"The machine which will vend a tasty hot platter for the patron who wants a heartier meal is just rounding the technological corner," he says.

Four industrial trends

Goldman cites the following industrial trends "which presage this rapid movement toward automatic feeding:" (1) The growing tendency toward the half-hour meal period; (2) the rising costs of conventional cafeteria operation; (3) the erection of new plants in outlying areas where commercial feeding facilities are not accessible; and (4) the endorsement which management is able to give to coin-operated cafeterias on the basis of its own experience.

Moore agrees that the greatest revolution will be in the area of automated meals, including "Hot meals brought almost instantly from the frozen or refrigerated stage to piping-hot."

New packaging "To make vended foods more attractive" is foreseen by ARTHUR D. STEVENS, assistant vice president of THE VENDO CO., Kansas City, Mo.

"Experimental work is being conducted in designing plastic containers in a rainbow of colors and in every possible shape compatible with existing vending equipment," says Stevens.

Colored metals in new weights are good bets in the race for more attractive containers for vended foods, according to Stevens.

"In the not-too-distant future — perhaps within five years — we will have foods preserved by irradiation which will have almost unlimited shelf life and which can withstand extremes of temperature," Stevens predicts.

The vending machines of the next decade themselves will be designed along new concepts, the four predict.

WILLIAM C. McCONNELL, JR., president of AUTOMATIC MERCHANDISING CORP., Medford, Mass., says "The equipment needs of operating companies in recent years indicate a growing demand for more versatile vending machines.

"I mean a *single* machine which can offer the consumer a wide selection of products.

"Perhaps the most accurate single term to describe the machine of tomorrow is to call it 'space vender'," says McConnell. "Such a machine will be the equivalent of a store counter or cafeteria counter offering a variety of merchandise to the consumer at many different prices."

Greater price flexibility and proper insulation for high and low temperatures are other basic features of McConnell's "space vender."

"If vending machine manufacturers will devote the same zeal to the design and production of quality 'flexible space venders' over the next decade that they have devoted to 'specialized product venders' over the past decade, the rate of growth of this industry will exceed the expectations of our most optimistic cheer leaders," McConnell believes.

"My principal reason for optimism is that the extraordinary growth of our industry is attracting more investment capital each year. Such funds are being used for improved market analysis to determine equipment needs. Operating experience, combined with a higher quality of engineering skills, will result in the design of ever more versatile and dependable vending equipment."

"The advent of automatic bill changers will conquer a major obstacle — sales are now limited to less-than-a-dollar items and to one machine at a time," Moore says. "Several bill changers are already in advanced development, and through them multiple machines (and product lines) will be coupled to one unattended 'cash register'."

Coin "laundry stores"

"A vast market will be opened by such devices as the automatic around-the-clock coin laundry store, the insurance policy vender on our highways and at airports, the automatic ticket seller, and the automatic selling of books, newspapers, and magazines," Moore states.

"Automatic merchandising will certainly see opportunities in the 60's which are far beyond our facilities today," the four forecasters agree. "But vending is still based on the consumer's sudden impulse to buy a product or service which is pre-sold and conveniently at hand when and where he needs it, and he buys it almost one at a time.

"Rather than replace *existing* sales channels, we will open *new* marketing opportunities for getting goods and services to the consumer."

Home laundry appliances—outlook is up

by Guenther Baumgart • PRESIDENT, AMERICAN HOME LAUNDRY MANUFACTURERS' ASSOCIATION

MANUFACTURERS OF HOME LAUNDRY appliances shipped 5,495,000 units during 1959. This is nine per cent more than the 5,043,000 shipped in 1958, and the third best year in the history of the industry.

In 1960, the industry is now forecasting that it will sell 5,709,000 units, a four-per cent gain over 1959 and a record year second only to the 1956 alltime high.

Table one gives details on this, showing that automatic washers are the industry's most important product, with both dryers and combinations gaining strongly.

Table two shows further, and interestingly, that the actual gains were nine per cent for 1959 over 1958, and the forecast gains are four per cent more for 1950. The greatest gains which were actually accomplished were in gas dryers and combinations, in that order.

This may be compared with the greatest gains forecast to be in combinations again, and electric dryers.

The industry will be watching with avid intent to see how this intra-mural race comes out.

Industry forecasts have proved to be conservative

In evaluating the position, it is well to remember that on top of all the other uncertainties of economic forecasting — such as strikes, general trends, unemployment-employment ratios, money supply, worldwide political developments and consumer whims and fancies — one of the greatest factors influencing any industry forecast is the efforts of the industry itself to use the very forecast as a basis for action to make the forecast wrong!

Industry forecasts are carefully made by competent people — and are as right as can be *at the time the forecast is made.*

But as soon as AHLMA's members make a forecast, they set out to do *better* than they forecast!

See in table three how this worked in 1959. The industry seucceeded in bettering the beginning estimates by 395,000 units, or eight per cent.

Looking at it another way, a year ago the industry forecast a five per cent increase. Then they accomplished a nine per cent one. They forecast the largest percentage increases for combinations, electric dryers, and gas dryers, in that order. Actually, the largest percentage increases were accomplished for gas dryers, combinations, and electric dryers, in that order.

It is possible that, in 1960, the industry will do enough better than forecast to put 1960 at the alltime peak — exceeding even 1956. If so, it will foretell a great and strong trend for the expanding 1960's decade.

Favorable factors for 1960

Favorable factors this year which will help the industry to do better by the end of 1960 than it now forecasts, include:

1. Continued strong consumer demand coupled with rising personal income — $1,889 per capita in the third quarter of 1959 as compared with $1837 a year earlier and $1,742 in 1956.
2. Continued widespread employment — 66,831,000 persons in October, 1959 as compared with 65,306,000 a year earlier and an average 64,700,000 in 1956.
3. Continued population growth and family formation increases.
4. Rapidly developing basic technology in home laundry appliances coupled with similar innovations in home launderable fabrics — "wash and wear."
5. The *unsaturated* market for automatics (about 60 per cent), dryers (85 per cent), and combos.
6. The replacement market for the products sold in the post World War II boom which, by reasons of wear and obsolescence, owners are now justified in replacing with new machines embodying modern features.
7. The industry's sales effort to gain in its proportion of the total consumer dollar coupled with the increasingly-greater time and money saving consumers derive so easily from current appliance designs.
8. Consumer confidence in continued prosperity (especially if steel strike uncertainty is settled) will enable him to commit himself to major appliances either through direct purchase or through time payment plans.
9. The basic improvements being accomplished in service management and product quality which will engender rising consumer confidence in appliances generally (and incidentally in greater brand loyalty, as well).
10. Continued high level home building. And a host of other factors.

Three adverse factors

Adverse factors which the industry will have to overcome or avoid if it is to do better than it now expects are:

1. Most important above all is the uncertainty arising out of the steel strike, as yet unsettled as this is being written.
2. Continued rises in consumer prices, principally other than major appliances, which will in part use up some, or perhaps even all, of the gains in per capita income.
3. Continued cost rises — in areas where productivity does not increase to match.

(More forecasts on Page 74)

Table 1

	1958	1959	1960
Combination Washer-Dryers	168,375	200,000	255,000
Automatic Washers	2,781,038	2,980,000	3,157,000
Wringer & Other Washers	891,311	915,000	821,000
Electric Dryers	823,522	920,000	981,000
Gas Dryers	378,676	480,000	495,000
TOTAL UNITS	5,042,922	5,495,000	5,709,000

Table 2

	1959 Increase from 1958	1960 Increase from 1959
Combination Washer-Dryers	19%	28%
Automatic Washers	8%	6%
Wringer and Other Washers	3%	—10%
Electric Dryers	12%	7%
Gas Dryers	26%	3%
TOTAL	9%	4%

Table 3

	Beginning Forecast for 1959	Actual Performance	Units Better than Estimated	% Better Than Estimated
Combination Washer-Dryers	200,000	200,000	0.	0%
Automatic Washers	2,800,000	2,980,000	180,000	6%
Wringer & Other Washers	800,000	915,000	115,000	14%
Electric Dryers	900,000	920,000	20,000	2%
Gas Dryers	400,000	480,000	80,000	20%
TOTAL	5,100,000	5,495,000	395,000	8%

Table 4

	Percent Gain Originally Forecast For 1959 over 1958	Percent Gain Actually Reached For 1959 over 1958
Combination Washer-Dryers	19%	19%
Automatic Washers	1%	8%
Wringer & Other Washers	—10%	3%
Electric Dryers	9%	12%
Gas Dryers	6%	26%
TOTAL	5%	9%

Compact 30-inch electric range is equipped with French doors and pull-out oven for ease in cleaning. Surface switches are grouped at right, and automatic oven controls at left on divided back panel.

"Stereo-Cooling" and low silhouette cabinet design are features of this room air conditioner. Air distribution grille directs cool, dry conditioned air around, not at, room occupants. A "Pin-Fin" cooling coil is said to be twice as effective as the ordinary type, and the unit has silent centrifugal fans and a cooling capacity of 10,000 Btu's per hour.

more new products on succeeding pages

New 1960 products by Frigidaire

Sculptured sheer look in the line of refrigerator-freezers is enhanced by a decorative touch of open-circle filigree and "metal sculpturing" as shown below.

(Right) — Refrigerator-freezer has 15 cubic foot capacity, and holds 150 lbs. of frozen food. Frost-Proof freezing system eliminates defrosting. Sheer-look styling is combination of metal sculpturing on edges of door and base panels, open-circle filigree, and squared-up lines.

Nickeloid helps make a family's world

Family living today is richer, easier because of a bright array of appliances and housewares that employ one of the breath-taking Nickeloid Metals. Dozens of appliance manufacturers have already scored important successes, increased market penetration — because of the beauty, production economy, and practical utility made possible by these metals. Product designers have combined the functional and the decorative to build more profitable sales. Nickeloid Metals, being completely pre-finished, simplify the entire manufacturing process. Send for free portfolio giving you the complete Nickeloid Metals story . . . provide your design, sales, and production supervisors with full details.

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NATIONAL LOCK

FASTENERS AND COLD-HEADED PRODUCTS, STANDARD OR SPECIAL-PURPOSE...THEY'RE DESIGNED TO YOUR SPECIFIC REQUIREMENTS AND ENGINEERED TO COST YOU LESS!

NATIONAL LOCK COMPANY
ROCKFORD, ILLINOIS
FASTENER DIVISION

(Above) — Model K78M refrigerator-freezer has Cold Mist Crisper, a vapor-tight compartment for keeping vegetables crisp. No Frost model is also available with optional ice maker and dispenser in the top freezer compartment. Capacity is 14.4 cubic feet.

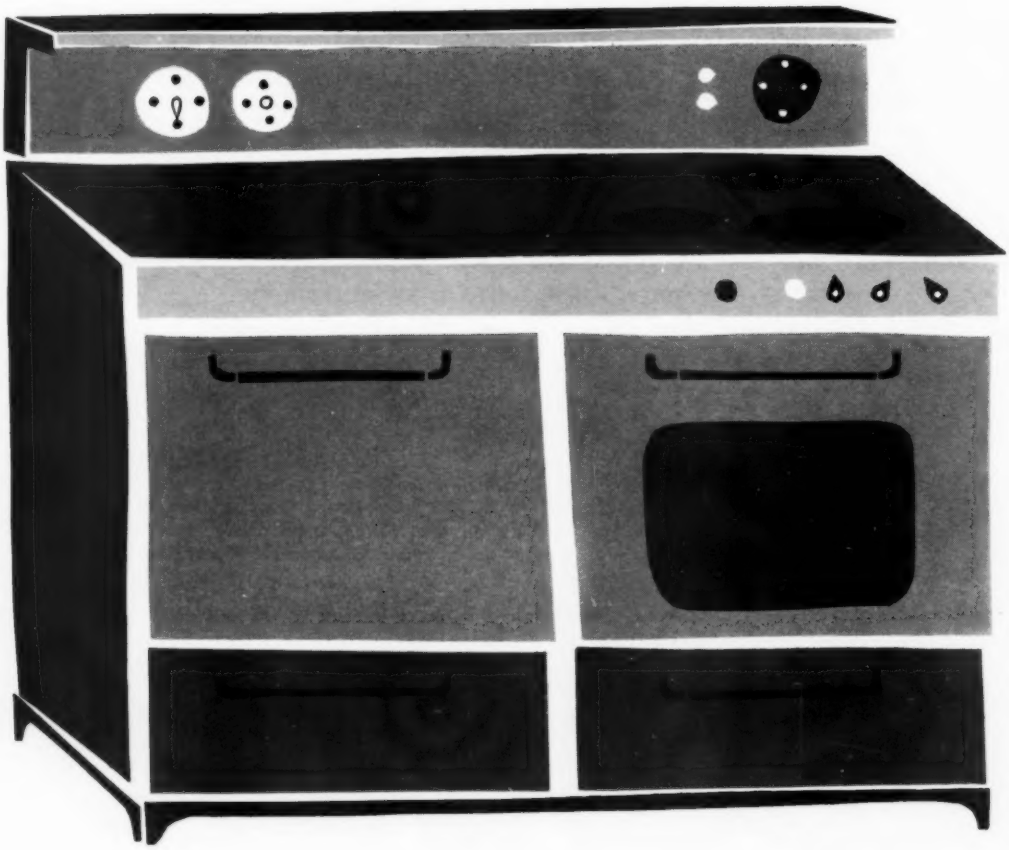
(Left) — Disposable foil linings in all ranges in both the 30- and 40-inch sizes protect both sides, back, top and bottom of oven, and are easily replaced with regular household foil. Surface units have removable chrome rings and aluminum drip pans.

New 1960 products by Kelvinator

(Left) — Air-borne germs are killed as they are caught in filters of the new line of room air conditioners. Washable filter material is impregnated with germ-killing chemical. Visual signal indicates when filter is clogged and in need of cleaning.

(Below) — Both built-in oven and surface cooking top are available in four decorator colors in porcelain finish, plus brushed chrome. Oven has variable-heat broiling, a rotisserie, and disposable foil liners for easy cleaning.

IF YOU'RE COOKING UP NEW WAYS TO SELL YOUR APPLIANCES, call on Brown-Lipe-Chapin right now! Let B-L-C engineers work with you at the design stage. We can help you add new sparkle to your product and help spark sales with Dura-Plate—the first major advance in chrome plating in the past twenty-five years. Also, under the same roof at Brown-Lipe-Chapin, you'll find mass-production facilities for quality, precision die casting and metal stamping. And for the finishing touch, there're facilities to anodize, polish and buff, electroplate and precision-paint any parts. Two plants, strategically located at Syracuse, New York and Elyria, Ohio, are ready to serve you with the same under-one-roof facilities. For further information, call or write Brown-Lipe-Chapin, Syracuse, New York.



GM GENERAL MOTORS

RELIABILITY by BROWN·LIPE·CHAPIN

DIVISION OF GENERAL MOTORS CORPORATION

This room air conditioner has a 1 hp compressor, and is rated at 9500 Btus. It has a thermostat, two-speed fan, permanent aluminum mesh filter, and has a heat pump for heating a room.

The removable top-loading rack of this portable dishwasher folds back on both sides and permits large dishes to be loaded easily. Fully automatic, it holds 12 place settings, and has five pushbutton controls which enable the homemaker to perform these kitchen chores: rinse and dry dusty dishes, warm dishes safely, pre-wash and rinse for day-long storage, and double wash for badly soiled dishes and glasses.

New 1960 products by Admiral

Use of a new high-density, more-efficient insulation has enabled engineers to reduce the thickness of cabinet walls on food freezers by ¾ of an inch on each side, and increase capacity approximately 15 per cent. Walls of this 18.7 cubic foot upright freezer now are only 2⅛ inches thick, and provide space for an additional 74 pounds in the same size exterior shell used last year.

(Below) — Three swing-out shelves are included in the Dual-Temp refrigerator-freezer. Each shelf can hold more than 90 pounds of food. Twin lights illuminate the inside, and two porcelain food crispers hold 29 quarts of fruit or vegetables.

(Below) — An automatic rotary roaster is optional on this electric range with double ovens. A precision cooking device features four Flex-O-Heat controls.

CLEANER "WALKS ON AIR"

Fabricating spheres for the Hoover Constellation vacuum cleaner

The draw requirements involved in forming halves of the Hoover Company's sphere-shaped vacuum cleaner is discussed by H. M. Kepler, Hoover production manager, seated, and R. O. Ross, company steel buyer.

THE HOOVER Co., North Canton, Ohio, manufactures its Constellation vacuum cleaner in two models. Both provide their own locomotion during the vacuuming operation by discharge of air through the bottom of the sphere, which enables the cleaner to "walk on air." Fabrication operations for the 12½-inch diameter spheres which form the "body" of the cleaner are considered very important, as is the drawing quality of the cold rolled steel used for these parts.

The top and bottom halves of the spheres are formed separately in a one-stroke stamping operation, using 19-inch circles blanked from 22-gauge cold rolled sheets. The halves of the sphere are drawn to depths of 6.037 and 6.027 inches, respectively.

In referring to this rather severe draw for a one-stroke stamping operation, Ralph O. Ross, Hoover Co. steel buyer, said, "We would be hindered by metal breakage during the stamping operation, and troubled by die marks and surface imperfections on the completed spheres, were it not for a number of advantages of the cold rolled steel."

Formed in a one-stroke stamping operation, these 12½-inch diameter sphere halves are stamped from 22-gauge cold rolled sheet. Joined together, the halves form the body of the spherical-shaped Constellation vacuum cleaner.

PHOTOS COURTESY JONES & LAUGHLIN STEEL CORP.

Final inspection of the Constellation follows fabrication, finishing, and assembly at the company's North Canton, Ohio plant.

Drawing quality is listed as the number one requirement, but surface finish, formability, and non-aging are listed as important factors, also.

The steel used is aluminum killed to minimize the possibility of developing stretcher strains after forming, and to insure against age hardening.

The company feels that it must have a smooth, clean surface and will not tolerate even minor surface imperfections which might result in a poor finish. Die marks are considered cause for rejection.

Following fabrication, the spheres are cleaned, phosphatized, and painted for delivery to the assembly lines.

MULTI-FUNCTION WILCOLATOR CONTROL

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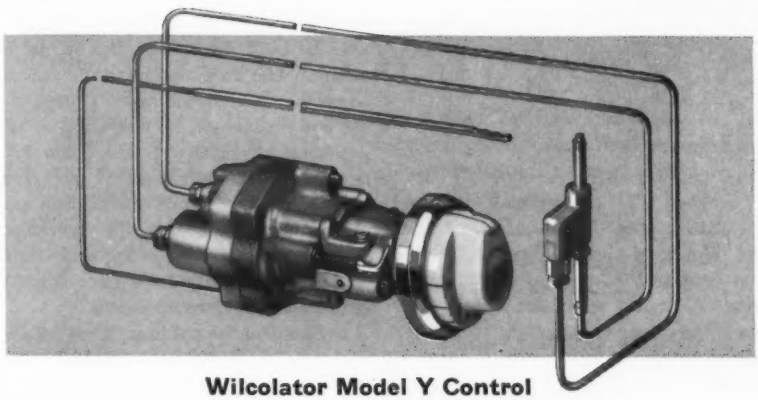
2 Positive safety shutoff

3 Smaller, more compact

4 Simple construction, easier to service



Wilcolator Model Y Control

Temperature range:
200-500°F, plus broil

AGA rating, Btu/hr:
Manufactured gas—43,045
Natural gas—63,700
LP gas—136,000

The Wilcolator Model Y thermostat is a high-capacity unit delivering top efficiency as a gas valve, automatic pilot, oven temperature control, and pilot filter. Its advantages (shown above) add up to dollars-and-cents savings.

The Model Y is designed to be installed quickly and easily on any gas range . . . with a minimum number of fittings. At the same time, it is extremely easy to service because of its simplified construction and the fact that adjustments can be made from the front of the range. It is also available with filtered top burner pilot takeoff which eliminates a separate pilot filter. Throughout, the Model Y reflects the benefits of Wilcolator's 35 years' experience in the thermostatic control field. It is described in detail in Wilcolator's Bulletin 568 — copies are yours for the asking.

Thermostats for Every Heating and Cooling Application

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The coated steels

by Lester F. Spencer • CONSULTANT

PART ONE: ALUMINIZED STEEL

MPM SPECIAL FEATURE

Although steel has been the standard of strength for hundreds of years, it has one weakness in that the surface is quite reactive. One common method used in protecting this surface is that of bonderizing and subsequent painting. Other methods of protection would include the use of a more resistant coating of another less reactive metal — this being exemplified by the wide usage of electro-deposited metallic deposits and the use of dipped coatings of aluminum, zinc, tin and terne metal. The latter types of coatings are of immediate interest.

Aluminum coated steels

The bonding of aluminum to steel has realized the commercial development of two types of aluminum coatings. Thus, aluminized steel, Type 1, which has a coating thickness of about 0.001 inches, is widely used for component parts in appliance manufacturing, whereas, Type 2, which has a coating thickness of about 0.002 inches, is employed for outdoor exposure applications. Of greater interest to appliance manufacturing would be Type 1 aluminum coated steel which will be discussed in detail.

Type 1 coating is used to advantage where a resistance to both heat and corrosion is required. This material will withstand temperatures up to approximately 900° F. without discoloration, and up to about 1250° F. without destructive scaling. Above 900° F. the coating begins to alloy with the steel, forming an extremely tight, gray surface layer of an iron-aluminum alloy. This alloy is well known as a refractory material and, when once formed, the coating will not return to its original state upon cooling.

Another property, which is of particular value in electrical appliances, is its high heat reflectivity; this being attributed to the ability of the coating to resist alloying up to temperatures of 900° F. It will reflect approximately 80 per cent of the radiant heat while operating at temperatures up to 900° F., and it is used to advantage for such applications as oven liners, heat deflectors, and heating element retainers.

Working characteristics

Aluminized steel will withstand moderate forming, drawing, and spinning operations without damage to the coating. This material can be bent 180 degrees at room temperature over a diameter equal to twice its own thickness without peeling or flaking of the coating. The base metal will not fracture when bent flat upon itself. However, if the equipment will be operating at temperatures of 1100° F. and above, particularly under conditions of cyclic heating and cooling, more liberal bend radii are recommended. This will prevent possible crazing of the coating and insures the maximum corrosion and heat resistance of the formed parts.

In drawing operations, a number of precautions should be observed, which can be stated as:— (a) design with liberal radii so as to relieve friction, strain, and the inclusion of sharp corners; (b) adequate die clearances along with proper lubrication so that galling and scraping of the aluminum coating is at a minimum; and (c) use relatively slow press speeds for forming.

In most applications, the surface of aluminized steel requires no protective coating of paint. However, when a decorative paint is to be applied, the usual precautions in removing surface oil, dirt, or grease should be observed after which the part may be bonderized and subsequently painted. This material is frequently buffed and lacquered to improve its light reflective qualities and also to obtain various decorative effects. Since the material has a thin coating, light buffing is essential.

Welding

Several methods of welding aluminized steel is employed which would include both fusion and resistance welding processes; the latter mentioned methods usually are considered the most satisfactory. Resistance welding procedures will be very similar to that employed in the welding of the aluminum alloys. Fabricated parts to be spot welded require either a chemical or mechanical treatment in removing both soil accumulation and the surface oxide film. The removal of this thin film is particularly important in obtaining a uniform contact resistance during the welding process. Another important factor is that strong alkaline cleaners should be avoided.

In a spot welding operation, both top and bottom electrodes should be dome shaped and made from a high strength copper base alloy such as Mallory 3 and Elkaloy A, Electroloy XX, and SMS Alloy 103. Hard drawn copper electrode tips are seldom used since they will not maintain their contour during production welding. A two inch radius dome tip on both the top and bottom electrodes is considered good practice. If a small radius dome tip is used, deeper

Table 1 Aluminized Steel Spot Welding Data (For 50 KVA, AC Machine)

Sheet Thickness, Inches	Minimum Electrode Diameter and Shape		Net Electrode Force Pounds	Weld Time Cycles (60 per Second)	Approx. Current, Amperes	Minimum Weld Strength Pounds	Approx. Diameter of Fused Zone, Inches
	Lower Electrode d, Inches	Upper Electrode D, Inches					
0.020	5/16" — 1"R	5/16" — 1"R	350	8	8700	295	0.13
0.025	5/16" — 1"R	5/16" — 1"R	400	9	8700	420	0.14
0.030	5/16" — 2"R	5/16" — 2"R	450	9	9500	545	0.16
0.040	5/16" — 2"R	5/16" — 2"R	550	11	10400	920	0.19
0.050	5/16" — 2"R	5/16" — 2"R	700	12	11800	1350	0.22
0.060	5/16" — 2"R	5/16" — 2"R	900	14	13000	1765	0.25
0.080	5/16" — 2"R	5/16" — 2"R	1200	18	13800	2795	0.29

Notes: — (a) Material must be free from scale, grease and dirt; (b) electrode material with minimum conductivity 75 per cent that of copper and a minimum hardness of B75 Rockwell; (c) electrode is dome-shaped in all cases. Radius of dome is given for both upper and lower electrodes.
It is advisable to make final machine setting with a slight amount of copper aluminum alloy on the electrode tips, since the spot welding will be done with the tips in this condition.

surface indentation will be experienced, this being minimized by using a larger diameter radius tip on one side and the smaller radius tip on the other side. Excellent results in spot welding 0.018 and 0.024″ aluminized steel have been obtained by using a top tip of 3/16″ in diameter with a 3″ radius, while the bottom tip would have a 5/8″ diameter with a 10″ radius.

Water or refrigerated cooling of the electrodes is essential for maximum tip life and for the reduction of the copper deposit from the tips to the sheets welded. Pickup will be experienced during spot welding of this material, and even under the most favorable conditions, about 100 spot welds can be obtained before tip cleaning is required. Thus, aluminum pickup will alloy with the copper electrode and result in a lower electrical conductivity. During dressing of the tips with either No. 160 or No. 240 Aloxite abrasive cloth, care should be taken to maintain the original dome shape.

Due to the higher electrical conductivity of the aluminum coating, a higher electrical energy input is required for spot welding. Thus, for coated sheets of 0.018″ or lighter, the amperage requirements may be as much as 70 per cent greater than that used for the uncoated material. In addition, as the thickness of the coated material increases, the additional current required over that of the uncoated steel increases until, at about 0.080″, this value will be about 30 per cent greater. Both ac and dc type spot welders have been used successfully.

Details as to the conditions most favorable for the spot welding of aluminized steel are shown in Table I. A suggested setup used for an ac-type spot welding machine of 100-kva rating is as follows:— (a) adjust the current duration to 2 cycles. A longer duration increases flashing, spitting and tip indentation; (b) adjust squeeze and hold time to values that give the desired rate of welding. The values of these quantities do not seem to affect the welds; (c) adjust the electrode force to values given in Table I for the particular combination desired; and (d) adjust the transformer tap setting and the heat control dial for a low value of current. Make 25 to 30 welds in scrap material and increase the current gradually until excessive flashing and spitting occurs. Then reduce the current gradually until excessive flashing and spitting stops. Even this current will be high in comparison with the welding of mild steel. The spot welds should be checked on test strips and with shear test specimens.

It is suggested that seam welding of aluminized steel be performed completely under water, or to have streams of water directed on both the upper and lower rolls; this procedure realizing both maximum cooling and minimization of pickup of the aluminum coating by the seam welding wheels. In addition, provisions must be made for the continuous removal of the aluminum alloy that adheres to the seam welding wheels. Seam welders with double-knurl drive, Fig. 1, have proven satisfactory. The steel knurl loosens the aluminum alloy and makes it possible for 6 to 8-hour operation before changing seam welding wheels.

Since fusion welding procedures are valuable methods in production joining of the aluminum coated materials, a few words as to the recommended procedures can be made. During a fusion method of joining, some difficulty may be experienced in obtaining complete fusion of the base metal due to the formation of aluminum oxide. To prevent the formation of these oxides, which may mix with the molten weld puddle and thus contribute to the porosity of the weld, a flux is used in oxy-acetylene welding. This flux will float the objectionable aluminum oxide to the surface of the weld metal pool.

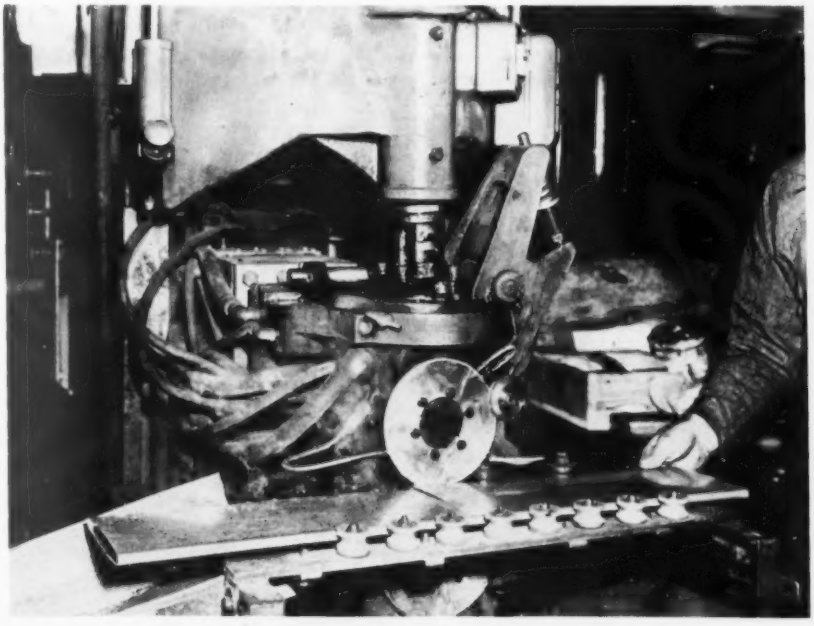
A satisfactory flux material would include Solar Welding Flux No. 16 GH, Fluxine No. 18, and Airco Flux No. 34. This flux is usually applied directly to the seam as a paste by mixing with a technical grade methanol containing less than 2.0 per cent water content. When making butt welds in sheet material, in which no filter rod is necessary, it is recommended that both top and bottom sides of the weld be fluxed. When it is essential to deposit additional metal to obtain the desired weld joint, the welding rod should also be fluxed. One welding rod type that has been tested and found satisfactory is Oxweld No. 1 H T steel rod. After welding, the flux remaining near the joint should be completely removed. Residual flux deposits contain chemicals which, in the presence of moisture, will attack the weld and adjacent metal.

In an arc welding procedure, minimization of the aluminum oxide formation is realized by the use of shielded electrodes; one recommended mild steel rod is Raco Fer-Al. Excellent results can also be obtained with the more expensive stainless steel rods of the 18-8 type with heavy extruded coatings. Both the atomic hydrogen arc and the inert-gas metal arc methods of welding have been found excellent in the welding of the relatively-light gages. A flux, similar to that used in oxy-acetylene welding, can be applied to the seam and filler rod in the atomic hydrogen method; in the inert-gas metal arc method of welding, either argon or helium can be used as the shielding gas.

NEXT MONTH
SECOND, AND CONCLUDING, PART OF
The coated steels

FIG. 1—Seam welding aluminized steel.

ILLUSTRATIONS COURTESY ARMCO STEEL CORP.



PRODUCT SERVICE

A customer oriented . . . appliance and television service

by H. J. Gensler • MANAGER, PRODUCT SERVICE, GENERAL ELECTRIC CO., DETROIT

IN THE FIRM CONVICTION that only satisfied customers remain customers, General Electric's Appliance & Television Distribution Department operates, in Detroit, a service whose prime objective is customer satisfaction. Products are sold through franchised dealers but service is rendered directly to the user. The GE Sales & Service Sections are in the same building and report to a district manager, thereby assuring that both function with a common goal.

A new sales, service and warehouse building located in northeast Detroit serves the metropolitan area. The service section occupies 30,000 square feet of space. This contains the television and appliance service shops, parts counter, parts warehouse and order service, service call receiving and radio dispatching area, and an office that correlates all service functions. Similar facilities are located at the district's two Michigan branches in Grand Rapids and Clio.

In Detroit, for direct or retail service, forty service trucks and two supervisory cars are two-way radio-dispatched from the office. Supplementing these, five independent subcontractors are used for special service requirements. This fleet maintains warranty service on appliances and television receivers sold by Detroit metropolitan area dealers. Service is offered directly to the user beyond the warranty period and this charge-type service is more than 60 per cent of the total. Because customer satisfaction is paramount, the service is available only on General Electric products.

(Above) — Here is the fleet of GE home appliance service trucks, lined up in front of the headquarters building. Each truck is now equipped with two-way radio.

Here is a section of the call-taking area in the headquarters communication center. There are eight call-receiving positions handled by girls, and two male radio despatchers.

Eighty-five per cent — single call completions

Each service truck has a representative stock of parts for the products it services. This stock averages nearly $2,000 for each truck. Nearly one half of the fleet are home laundry specialists servicing only washers, dryers, and combinations. Eight trucks are used for tele-

In this photo, a typical serviceman, operating one of the trucks in the service fleet, is in communication with the central despatch office.

vision service and the balance are general appliance repair, including refrigerators, freezers, ranges, dishwashers, waste disposers, and room air conditioners. With specialization, one-product brand, and a complete truck stock of parts, repairs are completed on the first call in 85 per cent of the homes entered. While in the customer's home, the serviceman checks all GE appliances.

Calls are radio dispatched to the men one at a time, and the men report back to dispatch at the finish of each call. This places the truck routing control in the dispatch office where it can be continuously varied to meet constantly-changing conditions. Since the two dispatchers know the next call, the customer is phoned and told that her GE serviceman will be at her home in about twenty minutes. This eliminates time consuming not-at-home, duplicate, and cancelled-type calls, and is an appreciated courtesy to the busy housewife.

An IBM card is used for each call and, with the tabulations produced, such items as service call productivity, number of incomplete calls, and the reasons, are readily available. Information as to the cost per home hour, the number of home hours, and warranty cost by product, etc. is given the service manager.

Regular training meetings

For technical proficiency, there is a standing rule that every serviceman attend a company technical training meeting at least once each month. At these sessions, new products are thoroughly discussed and the latest repair procedures are shown the servicemen. Customer relations are part of all meetings. Two technical specialists are employed, one on appliances and the other on television. Meetings for the company, dealers, and independent servicemen are held in either the classroom or the 150-seat auditorium in the Detroit building.

A customer satisfaction quality audit is continuously made by mailing a return-type post card to five per cent of all customers. The reply card is mailed by the customer directly to the department headquarters in Louisville, Ky. The cards are run through IBM and the results are returned to the district. Besides this audit, at times, every customer is telephoned two days after service has been performed and the customer's replies tabulated. Thus, General Electric has a continuous check on how well they are attaining their prime objective — customer satisfaction.

To support this customer service and to supply servicing dealers and independent service companies, GE maintains a complete stock of repair parts and accessories at its Detroit headquarters. The service of 18 employees are required to maintain the stock and to handle the customer parts counter, phone and mail orders, and shipping and receiving. A $250,000 stock of some 10,000 different items is a normal inventory. Shipments are made from this central stock to the entire district. The branches maintain a backup stock of operating parts.

Same-day parts shipments from stock to dealers

The parts section works on a 3:00 PM deadline. All orders received by 3:00 PM are shipped from stock the same day. In this way a dealer's order arriving before the deadline will be at his store the next morning. Parts for stock and special customer items are ordered from the company's national warehouse in Zanesville, Ohio every day at 3:30 PM by a punched tape teletype located in the parts section.

Shops for the repair of both major appliances and television receivers are in operation in the Detroit building. Facilities including hydraulic floor lifts for repairing heavy appliances, and a complete spray paint booth and oven, are part of the up-to-the-minute appliance shop. The television shop is equipped with laboratory-type instruments to assure technical accuracy. A small section of the shop is used to maintain the company's two-way radio system.

The GE District Product Service operates on a monthly operating statement. The service manager can not only tell what areas of his own district require attention, but also, through a national report, how he compares with the other General Electric Districts throughout the country.

While General Electric has other similar operations in over 25 of the principal metropolitan areas in the country, the largest percentage of service on GE products is still rendered by independent service organizations, dealer service organizations, and independent distributors. For example, some areas like Chicago have independent distribution and service on these same products. The comparative reports referred to are, of necessity, from the company-operated distribution — service areas, where statistical and accounting procedures can be controlled for statistical comparison.

In this section of the office at the communications center, these two despatchers handle the radio communication with all service trucks.

Low temperature porcelain enameling at Frigidaire

a one-year conversion program, involving seven ground coats and twenty cover coats, proves successful in a six continuous-furnace plant

by G. B. Hughes and R. J. Baker, FRIGIDAIRE DIV., GENERAL MOTORS CORP.

TOWARD THE MIDDLE OF 1958, the Engineering and Production departments of Frigidaire undertook a joint program to lower the firing temperature of all porcelain enamels from 1480°-1540°F. range to the 1400°-1450°F. range. Our purpose was to reduce the distortion of the parts being enameled, first because of the better strength of the metal at the lower temperatures and, second because of the reduced bowing of the parts which goes with the lower residual compressive stress obtainable in the lower temperature titanium-type covercoat enamels.

The requirements for the program were that the production rates could not be reduced, the furnaces were to be used without major alterations and there could be no lowering of standards or quality. Only the refrigerator linings were included in this program in the refrigerator plant. This was quite simple because only the ordinary types of groundcoat and covercoat are required and each is fired in its own furnace. The conditions in the range plant are considerably more complex and this plant will be used as the basis for our discussion.

The magnitude of the changeover in Plant 3 is indicated by the need for the development of seven groundcoats and twenty covercoats. These included (a) blue groundcoats for dipping, spraying and reinforcing, (b) gray groundcoats for dipping and reinforcing and (c) blue and gray alkali-resistant groundcoats. The covercoats included (a) one white and eight colors with low stress for exterior parts, (b) one white and eight colors with high stress for range tops, (c) one alkali-resistant color and (d) one white for stippling.

The complexity of the changeover is indicated by the fact that six furnaces and many different kinds of parts were involved. Four basically different types of groundcoats and five basically different types of covercoats were involved, to say nothing of the variations within the colored covercoats. Also, with some exceptions, each groundcoat or covercoat had to be capable of being fired along with its companions.

Procedure

The order of development of the various enamels was based on the ease of changeover in the factory. The alkali-resistant gray and blue groundcoats for washing machine tubs were selected for the initial tests since this part was fired by itself. The lower temperature in this furnace made it available for small production trials of the other groundcoats. As the developments progressed we learned that the lower-temperature covercoats could be fired satisfactorily over the high-temperature groundcoats. This arrangement made it possible to test and adjust each of the covercoats at the lower temperature. After a covercoat furnace was converted, then the high temperature groundcoat materials were used up before the groundcoat furnace was converted.

Groundcoats

The early production trials brought

How low is "low" temperature

Low temperature application of porcelain enamels has been the aim of the enameling industry for years. Actually, porcelain enamels have been applied to steel with reasonable success, for specialized work, in the 1250° F. range. Aluminum enamels fall in the under 1000° F. range.

Nevertheless, practical enamelers will appreciate the enormity of the problem at Frigidaire when the great number of products, the size of the plant installation, and the great number of different enamels in use, are given consideration — plus the rigid quality and control standards required. For example, with some thirty enamels to be considered, each is designed to do a specific job or fill a special need. Many must be integrated since they are run together at the same time. Therefore, in developing new enamels to fire at lower temperatures, many factors must be considered, in addition to lower maturing temperatures.

Enamels must have as good chemical properties as enamels on existing products; colors must be the same; and the supplier must be prepared to match every color Frigidaire has used. Replacement parts, naturally, must match the rest of the original product.

In Plant 2, Frigidaire enamels refrigerator parts, but enamels for exteriors are different than the enamels for interiors. Hydrator pans require still another type of enamel.

In Plant 3, where ranges and other major appliance parts are produced, the problem is even more complex. Range tops need a special kind of enamel to resist stresses of sudden changes in temperature. The enamel for range sides falls into a different category. Colors for ranges must also be considered. For example, some frits may perform well for producing blues, while other frits may be needed for yellows.

Washer tubs must be finished in enamels with high resistance to attack by the alkalis in modern detergents. The tops and doors of washers must also have built-in alkali resistance, in addition to the proper "finish" for exterior parts.

It will be obvious that a conversion program such as the one described here called for the closest cooperation between the materials and process engineering division of the finishes section, the production management, and the suppliers of materials.

With these factors considered, the one-year conversion program from 1480° F. - 1540° F. to 1400° F. - 1450° F. takes on new significance.

This was sufficient reason for MPM editors to select this comprehensive report by Hughes and Baker for publication, with the sure knowledge that it will get close attention throughout the appliance industry.

The Editors

out some shortcomings in the groundcoats which were not apparent in the laboratory testing. Some of the problems which were recognized early were the migration and concentration of salts during drying, color variation of the blue groundcoat on parts which do not receive uniform firing treatment, black-specking or copperheading in the gray groundcoat and instability of the set of the milled enamel in both the blue and gray groundcoats, especially after long aging periods.

With each step in the development work, and as we gained more production experience with the new materials, we found that more rigid control of all phases of the process had to be maintained. This was particularly true in relation to the spray pickling machines and the furnaces. In some instances, higher dryer temperatures were found to give improved results.

The first blue groundcoats were quite susceptible to "salt-lining;" that is, the migration of soluble salts during drying with consequent concentration by the wick-effect in the areas which dry first, especially along the radii of flanges and embossments. This effect was reduced by the re-selection of a frit, by readjusting the mill addition and, in some cases, by raising the dryer temperature. The residue of neutralizer salts on the metal also seemed to have a contributory effect.

The lower temperature groundcoats were found to have less tolerance for the amount and kind of neutralizer salts left on the ware from the pickling process. A method was found for determining the effect of these salts and for adjusting the neutralizer solution which was very effective. Two 12 inch by 12 inch panels were pickled and one was washed with deionized water and dried. Both were dipped in groundcoat enamel and drained. By determining the amount of enamel picked up by each we could readily tell when the neutralizer was out of balance and was causing poor draining. Adjustments in the borax-soda ash ratio and closer control were necessary as compared to the higher-temperature enamels used previously. In studying the effect of nickel deposits, we found that our standard of .030-.065 gms/sq.ft. was satisfactory.

Both the blue and the gray groundcoats were found to be more susceptible to the variations in pickling which occur in spray-type pickling machines. When there was not complete coverage of all surfaces of the parts by the pickle solutions, there was a loss of adherence with both types of groundcoat and/or some black-specking or copperheading with the gray groundcoat. Metal-loss determinations were found to give a good indication of the activity of the acid and the condition of the acid sprays. This determination is made on the same test panel as used for the nickel deposit check.

The first blue groundcoats were somewhat susceptible to color variation under some firing conditions. This was noted on an oven inner-door panel which has a back-up panel welded to it. The groundcoat on the face panel was of deeper and darker color, such as results from hard firing, in an area opposite a large cut-out in the back-up panel. This was remedied by re-selection of a frit and by reducing the amount of salts in the mill addition.

During the first lower-temperature groundcoat trials on washing machine tubs, traveling thermocouples were used to determine the firing curve. Burner adjustments were made until the furnace was brought into balance at the lower temperature setting and the desired curve was obtained. This procedure was used on each furnce as the change-over progressed. The furnaces required no other alterations.

Laboratory furnace firing ranges were satisfactory for determining the adherence and maturing properties of the groundcoats. Accelerated aging tests at 110°F. were found to be valuable in eliminating frits which had a tendency to cause poor set stability while in the dip tanks or poor surface texture when fired. Millings of 1000 pounds or larger were necessary to accurately determine the set requirements and quality of drain on critical parts.

Covercoats

The covercoats did not present any different kinds of problems than we had experienced with the higher-temperature covercoats. Defects such as pits, blisters, poppers and color instability on edges were not readily detected in the laboratory. It was not until production parts were fired in the large furnaces that these defects were encountered. New frits were developed or the mill additions were adjusted to eliminate these defects. The color-stability of the low-temperature colored covercoats as related to variations in firing has proven to be superior to that of the higher temperature covercoats.

As the covercoat developments progressed, we shortened our testing time by the use of 4000 gram laboratory millings instead of the usual 1500 grams, especially for the final color matching. The larger milling produced results more comparable to the production mills and they permitted the preparation of both laboratory specimens and production parts for judging final color matches.

A very valuable aid in making color matches was the use of a box in which test panels were hung for firing in the laboratory furnace. This is a 20 gage, stainless steel, double-walled, open-end box of such size in relation to the furnace that by proper choice of time and temperature-setting the firing effect of a production furnace was approximately duplicated. The use of this box effectively reduced the time for matching colors and, by systematically varying the time and temperature, it gave excellent indication of the color stability which could be expected in a production furnace. We found it possible to go directly from a 4000 gram laboratory milling to a 1000 pound production milling with relatively small oxide adjustment.

After we learned we could put the low-temperature covercoats over a high-temperature groundcoat, one covercoat furnace was operated at the lower temperature with white covercoat on one shift. This permitted us to check out the furnace, make production color matches and obtain general production experience with each of the other covercoats before committing this covercoat furnace or converting the other one.

Conclusion

The first of the production furnaces was converted to the lower temperature in September of 1958 and the last in September of 1959. This may seem like a long time but we chose to study each problem as it came up and to redevelop, correct, adjust or improve as we went along. In consequence, many of the shortcomings of the lower-temperature enamels which are noted in this report have been overcome and the necessary adjustments of the controls and procedures have been established.

In the overall, the operations today are successful and comparable to those with the higher-temperature enamels although further improvements are being sought.

In prosecuting this program, we have met the requirements of not changing the production rates, the furnaces, the standards or the quality. We have achieved the reduction in the distortion of the parts which was sought and we have concluded that the lower-temperature porcelain enamels are here to stay.

Adapted for MPM *from a paper presented at the 21st Annual Shop Practice Forum of the Porcelain Enamel Institute at the Ohio State University.*

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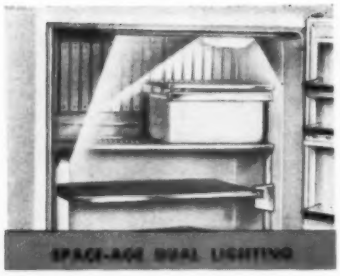

"HOTPOINT'S INSULATION 'BREAKTHROUGH' SOLVES SEVERAL BASIC MARKETING PROBLEMS, ONE OF WHICH IS TO GIVE REFRIGERATORS A 'REDUCING PILL.'"

Howard J. Scaife
Marketing Manager, Refrigeration Department

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John F. McDaniel, General Sales Manager

The Hotpoint Space-A

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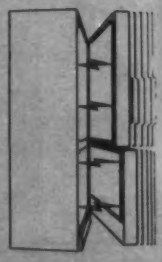
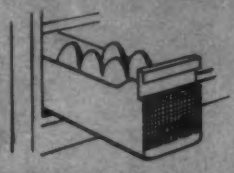


MAGNETIC DOOR GASKET

SWING-OUT SHELVES



PULL-OUT EGG RACK

SWING-OUT CRISPER

ıce-Age 18 refrigerator-freezer

AN MPM DESIGN FEATURE

HOTPOINT EXPECTS TO LEAD A TREND in 1960 to larger capacity refrigerators that require no more floor space than earlier models of far less capacity.

Focal point of the new 1960 Space-Age line is the Space-Age 18, an 18-cubic foot refrigerator-freezer that has the same exterior measurements as the 14 cubic foot model for 1959. Floor space requirement is only 25 x 32 inches.

The "trend" reflects the use of new, more efficient, and more compact insulation. Hotpoint has spent over five years developing and testing "Wonderwall," a laminated product combining a finely-spun fiber glass with polyethylene, saran, and kraft paper. Field tests show insulation in one-inch thickness is comparable to the conventional insulation previously used in three-inch thickness. Result: Four inches gained inside cabinet walls — over four cubic feet added to food storage areas.

The new thin-wall refrigerators also have been designed to take advantage of the change, appearance-wise. They are designed with square lines, for the built-in look, in keeping with overall kitchen design trends. The new models permit flush-to-the-wall installation and a 90° door swing. There is 100 per cent accessability to all foods, due primarily to the swing-out shelf and basket.

The Space-Age 18 has swing-out shelves, swing-out crisper pans, and pull-out egg rack in the 11.5-cubic foot food storage section. Mounted in the door is a "Dairy Stor" cabinet with heated butter compartment.

The frozen food storage section (bottom section) is rated at 6.6 cubic feet, to hold 230 pounds of frozen food. This section is equipped with a swing-out basket and a sliding basket for food accessibility, and the door is foot pedal operated. Other features include "no-spill" ice trays and juice can dispenser.

The "Magna-Seal" doors employ the continuous-strip-magnet closing, and the complete refrigerator is mounted on rollers for ease of moving to clean the floor.

Inside trim

The door shelves are an integral part of the molded inner door liners. Shelf fronts are in natural color anodized aluminum.

Model demonstrates the difference in thickness between Hotpoint's new "Wonderwall" insulation and the conventional insulation used previously.

The vertical Dairy-Stor is mounted in the upper right-hand corner of the door liner and held by screws which thread into plastic grommets.

The butter compartment of the Dairy-Stor has two resistance heater wires sewed to an aluminum foil backing. The heaters are controlled by a three-position switch. The heater leads are connected to the control switch by spade terminals.

Food pedal for freezer door

The foot pedal for opening the freezer door is mounted in the cabinet flange at the bottom of the cabinet and is spring-operated. When the pedal is depressed, a lever presses outward against the door to open it. When the pedal is released, the spring returns the level to a vertical position.

Swing-out shelf

The swing-out shelf and support are mounted to a ladder, and nylon runners on the support slide in the grooves on the ladder. A spring-operated locking device is provided so that the shelf assembly can be adjusted up or down. The release buttons for adjusting the shelves are placed at the back to avoid accidental release or tampering by children. The swing-out shelf is held to an aluminum rod frame by two spring clips.

A metal liner stiffener is used to reinforce the liner wall where the ladder is mounted. To provide additional support for the liner, two support brackets are fastened to the liner stiffener, and they are screwed to the inner flange of the outer cabinet.

Freezer swing-out basket

There are two baskets in the freezer section. A small basket is mounted inside of the main basket for easy access.

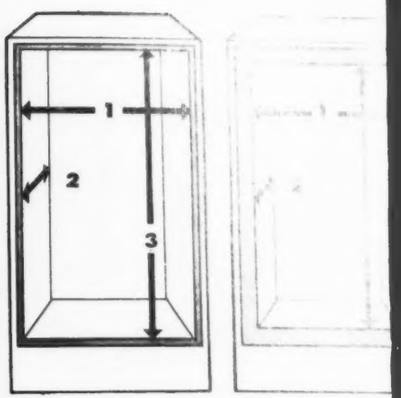
The main basket has a metal plate welded in the right front corner, with both top and bottom bent to a ninety degree angle. The horizontal sections of the plate have hinge pin holes equipped with nylon bushings. These bushings ride on pins of the upper and lower basket hinges.

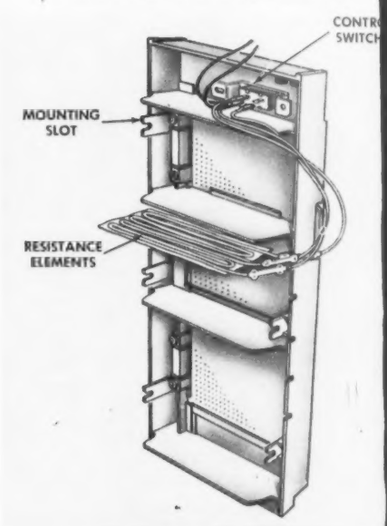
Defrost water disposal

The Space-Age 18 has automatic cooling coil defrosting in the fresh food compartment and an automatic disposal system for water.

During the "off" cycle, frost on the cooling coil melts, and the water follows a drain trough through a rubber drain tube, which follows the back of the cabinet interior through the bottom and into the machine compartment. Here water is collected in a water disposal pan. The compressor is equipped with a sheet metal support to hold this pan. Heat generated by an auxiliary condenser, welded to the lower surface support, evaporates the defrost water during unit operation.

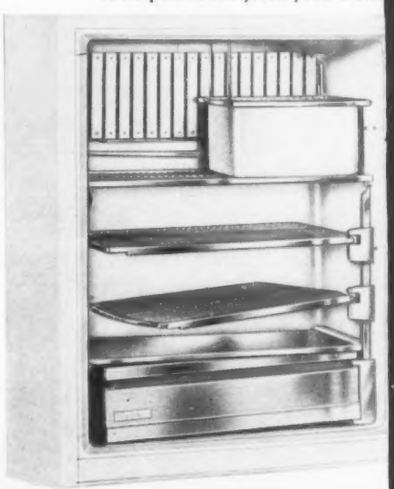
Automatic defrosting in the freezer section is accomplished by means of

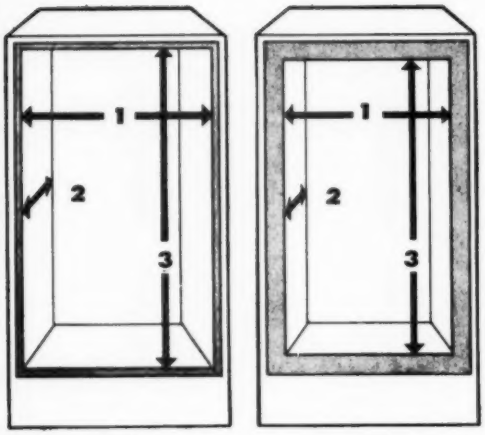




Rear view of the "Dairy Stor" com ment.

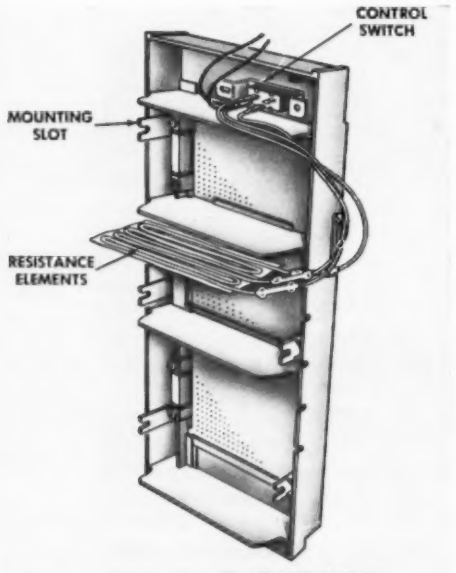
(Below) — Swing-out shelves and table pan in the fresh food secti





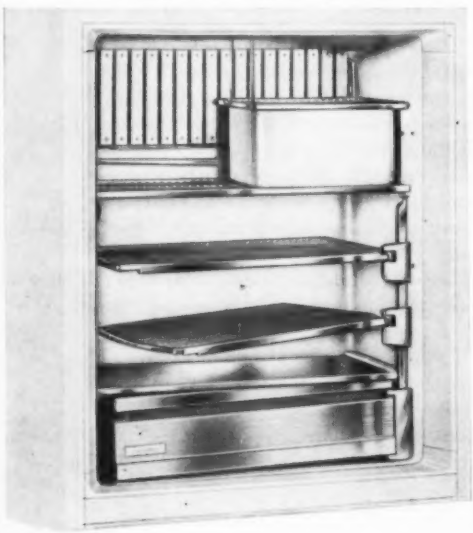
with WONDERWALL — with ORDINARY INSULATION

1. More space from side to side
2. More space from front to back
3. More space from top to bottom



Rear view of the "Dairy Stor" compartment.

(Below) — Swing-out shelves and vegetable pan in the fresh food section.



a defrost control timer which is mounted to the filler panel of the cabinet.

Defrost water collects in grooves of the drain pan under the freezer evaporator and flows downward through the filter well of the drain pan into the machine compartment. Here it is evaporated in the same manner as the water from the upper compartment.

Temperature controls

A constant cut-on type control is mounted in the fresh food compartment which senses temperatures at the left side, center, and right side of the cooling coil. The control knob has nine operating positions and an "off" position.

The electrical contacts within the control will not close until the temperature at the control bulb reaches approximately +37° F., regardless of the control knob setting. The knob setting affects the cutoff temperature only.

The thermostat control is like a tiny refrigeration system. The control capillary tube is filled with a volatile gas. Variations in temperature cause expansion and contraction of the gas in the capillary. When the temperature of the cooling coil at the control bulb reaches approximately 37° F., the gas expands and exerts enough pressure on the control bellows to close the electrical contacts within the control, thus energizing the compressor motor.

When the temperature at the control bulb is lowered to a pre-determined setting, the gas in the capillary will contract, and this relieves pressure on the bellows, allowing the electrical contacts to open, de-energizing the unit.

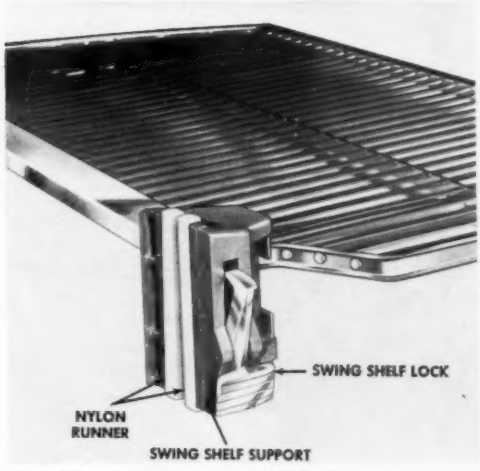
Defrost control timer

A freezer defrost control timer is used to facilitate automatic defrosting in the freezer section.

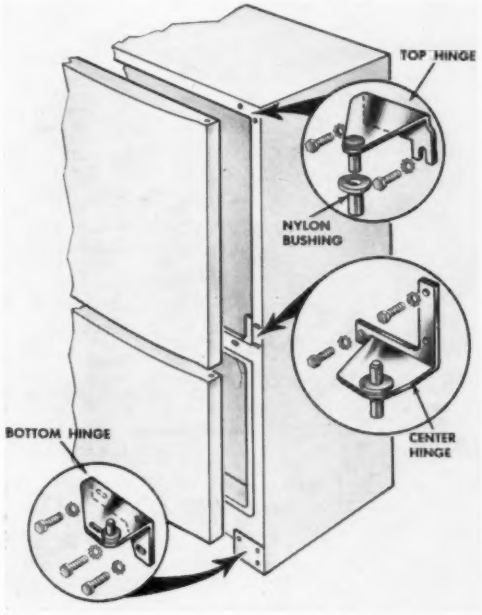
The control timer is mounted by screws to the timer mounting bracket, which is fastened by two screws to the filler panel. The mounting bracket has a dial with clock numerals. The control timer knob fits on the timer shaft and is used to set the timer to the correct time of day. Two sets of numerals indicating 3, 6, 9 and 12 o'clock are used. The dark or shaded side of the dial indicates P.M., and the lighter side of the dial indicates A.M.

When the refrigerator is installed, the timer knob is set to the correct time of day. The defrost period will then be 3 A.M. every morning.

Electrical current is carried to the unit by the defrost control timer. The clock mechanism of the timer will automatically open the electrical contacts in



View of swing-out shelf lock.



Hinge and mounting bracket details for the two-door refrigerator-freezer cabinet. (Below) — Thermostat control knob and dual light fixture with panel reflector.

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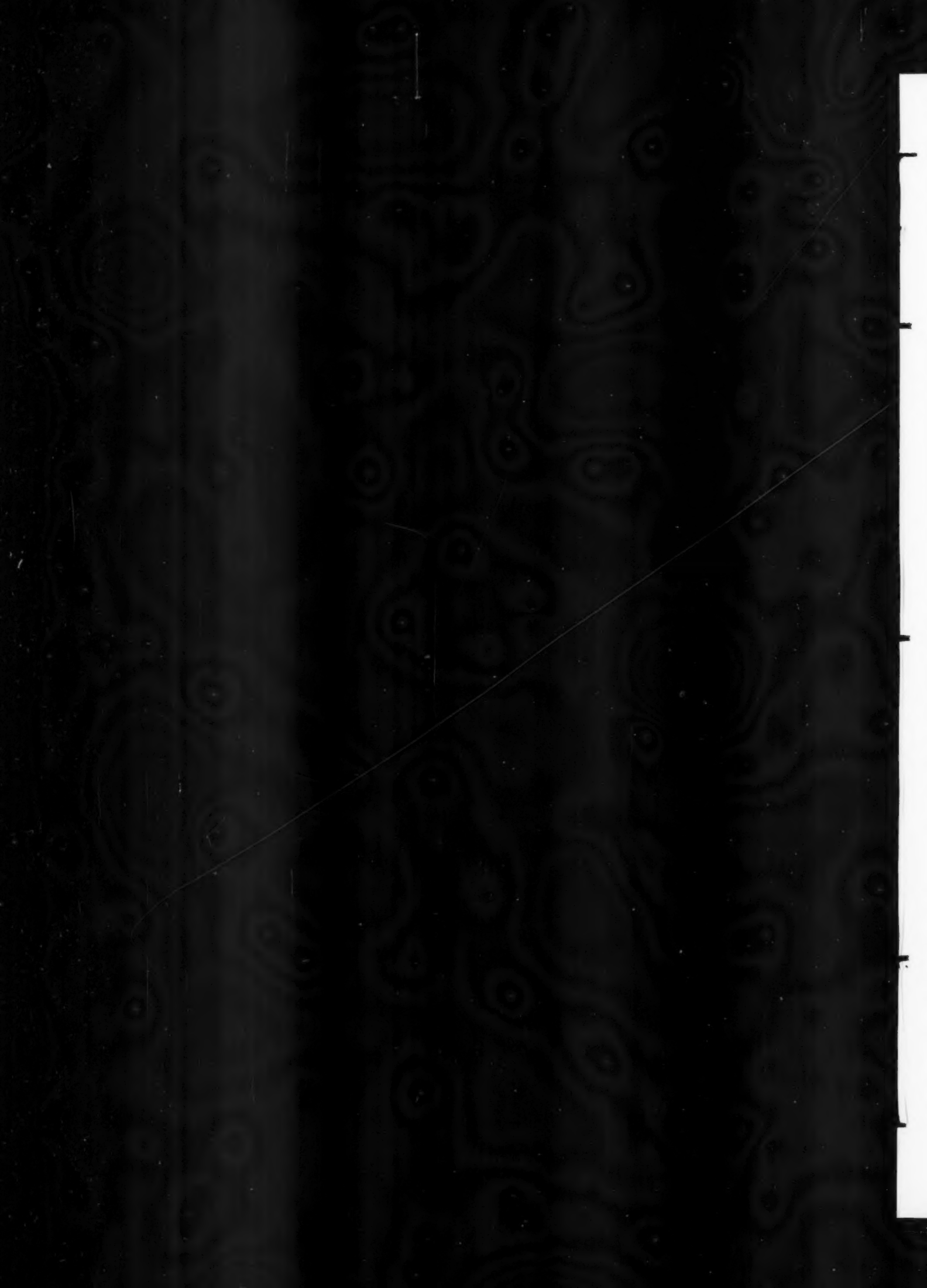
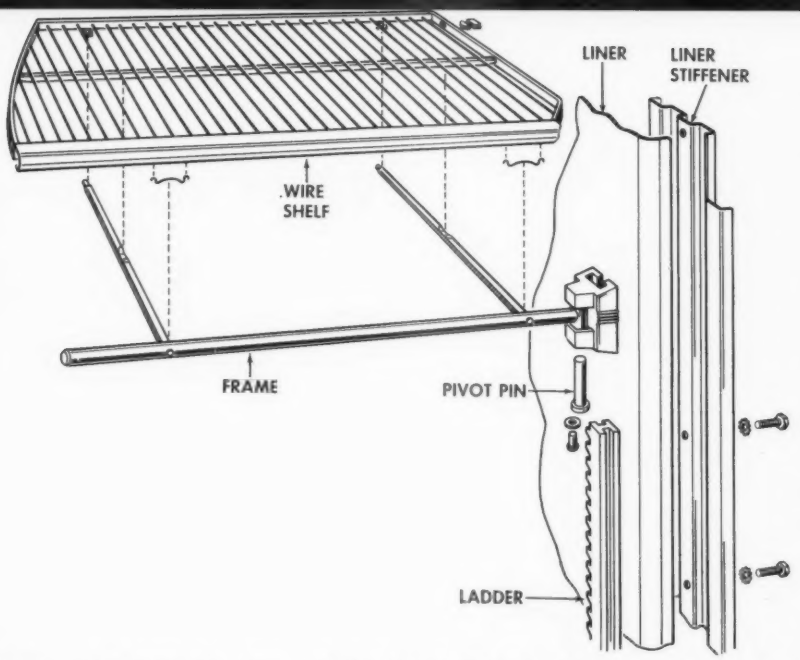




Disassembled view of swing-out shelf shows details of liner stiffener, ladder, shelf, and frame.

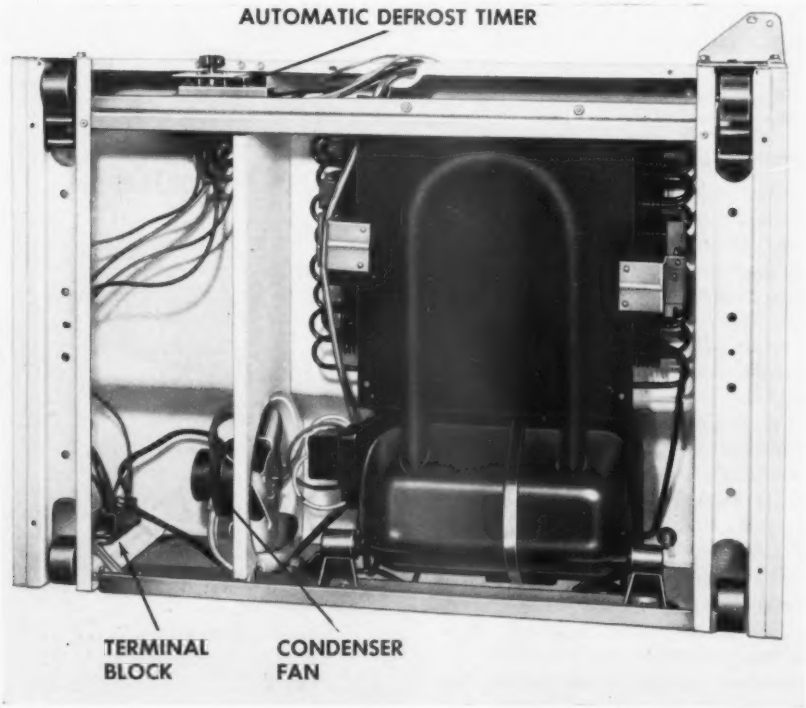
the unit circuit at 3 A.M. each day (or any selected defrosting period) to allow the freezer to completely defrost. A defrost heater is permanently sealed to the freezer evaporator tubing and is connected to the defrost control in such a manner as to operate only during the defrost period.

The defrost timer is set to re-energize the unit thermostatically when the temperature in the freezer evaporator has risen to 40° F. at the point of contact with the defrost control capillary tube. As a safety feature, should the thermostatically-controlled bellows fail to restart the unit, the timer will override the bellows contacts and re-energize the unit thirty-five minutes after the defrost period started.

Electrical components

The Space-Age 18 is equipped with a 3600 rpm, one-third horsepower compressor and a forced draft condenser.

Component details of the machine compartment for the Space-Age 18.



The electrical components consist of the compressor motor, relay, and "guardette" overload protector.

The *relay* is an electromagnetic device for making and breaking the electrical circuit to the starting winding. A set of normally-closed contacts is in series with the motor starting winding. The electromagnetic coil is in series with the auxiliary winding of the motor. When the control contacts close, the motor starting and running windings are both energized. A fraction of a second later, the motor comes up to speed and sufficient voltage is induced in the auxiliary winding to cause current to flow through the relay coil. The magnetic force is sufficient to attract the spring-loaded armature which mechanically opens the relay starting contacts. With the starting contacts open, the starting winding is out of the circuit, and the motor continues to run on only the running winding.

When the control contacts open, power to the motor is interrupted. This allows the relay armature to close the starting contacts. The motor is now ready to start a new cycle when the control contacts again close.

The relay is mounted to the left side of the compressor housing (facing the front) by a single, long screw. The screw extends through the relay and into the mounting bracket on the compressor.

A *guardette motor protector* is used to prevent damage to the compressor motor in case of abnormal electrical or operating conditions. The guardette consists of a set of normally-closed bimetallic contacts and a resistance heater mounted inside a plastic case.

If the motor has trouble starting for any reason such as low voltage, high voltage, high load, or stall condition, the heat from the resistance heater will cause the bimetallic contacts to flex open and interrupt power to the motor. The guardette contacts will also open due to excess heat from the compressor. For this reason, it is imperative that the guardette be in good physical contact with the compressor housing.

The guardette is mounted under the terminal cover in a position directly beneath the compressor terminals. It is held in position by a spring clip which fits around the guardette and clips over the compressor terminal.

Cycle of operation

The refrigerator-freezer contains two separate refrigerating systems, both served by the one-third hp motor.

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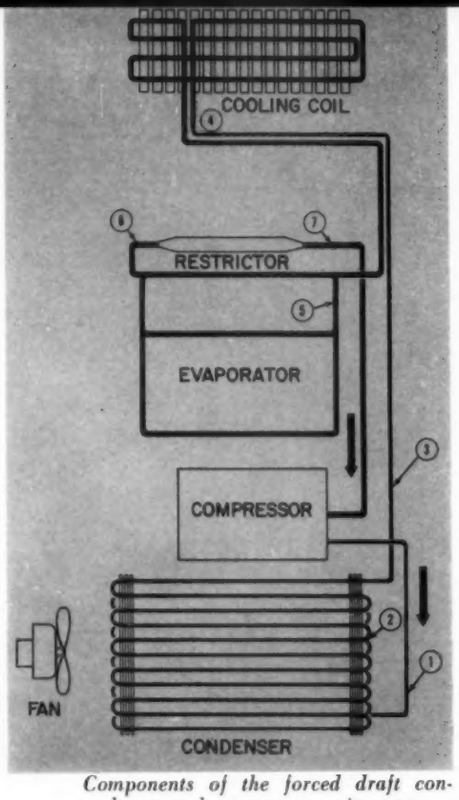


Components of the forced draft condenser and compressor unit system.

frigerated by a cooling coil mounted in the upper rear section of the inner liner. The freezer section is completely insulated from the fresh food compartment, and is refrigerated by means of refrigerant tubing bonded to the outside surface of the aluminum freezer evaporator.

The forced draft condenser is mounted in a horizontal position in the machine compartment.

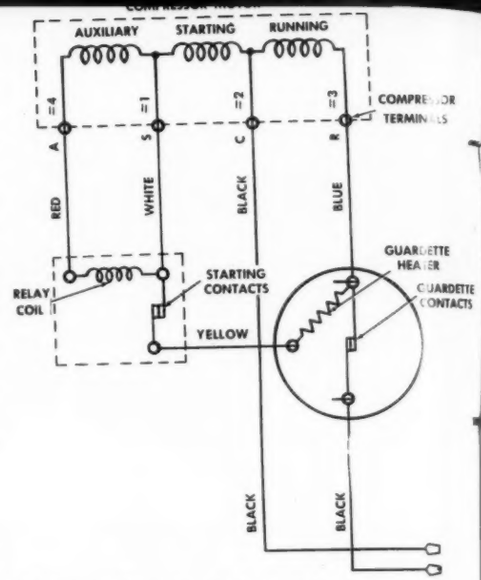
The condenser fan is mounted to a bulkhead which extends the full length of the machine compartment from front to rear. The fan pulls air from the front of the cabinet through the base panel grille into the machine compartment. The air circulates through and around the condenser to cool and liquify the refrigerant in the condenser tubing.

The compressor pumps gaseous refrigerant vapor under high pressure through the discharge line and into the coils of the condenser. Air circulating through and around the condenser coils cools the gas and condenses it back into liquid form. High pressure in the condenser forces the liquid refrigerant through a molecular sieve drier which keeps the entrance to the capillary tube free from obstruction and absorbs any moisture that may be in the system. The capillary tube regulates the flow of liquid refrigerant into the cooling coil. The capillary is an expansion device consisting of a small tube.

The capillary tube is connected between the condenser outlet and the cooling coil inlet. Refrigerant liquid under high pressure flows through the capillary and into the cooling coil. As the liquid enters the larger diameter cooling coil, the pressure against the liquid is sharply reduced. This reduction in pressure results in the liquid refrigerant boiling at a lower temperature, which improves the efficiency of the unit. Partial vaporization of the liquid occurs in the cooling coil, and heat is absorbed from the fresh food compartment as the refrigerant vapor-liquid mixture is forced through the cooling coil toward the freezer evaporator.

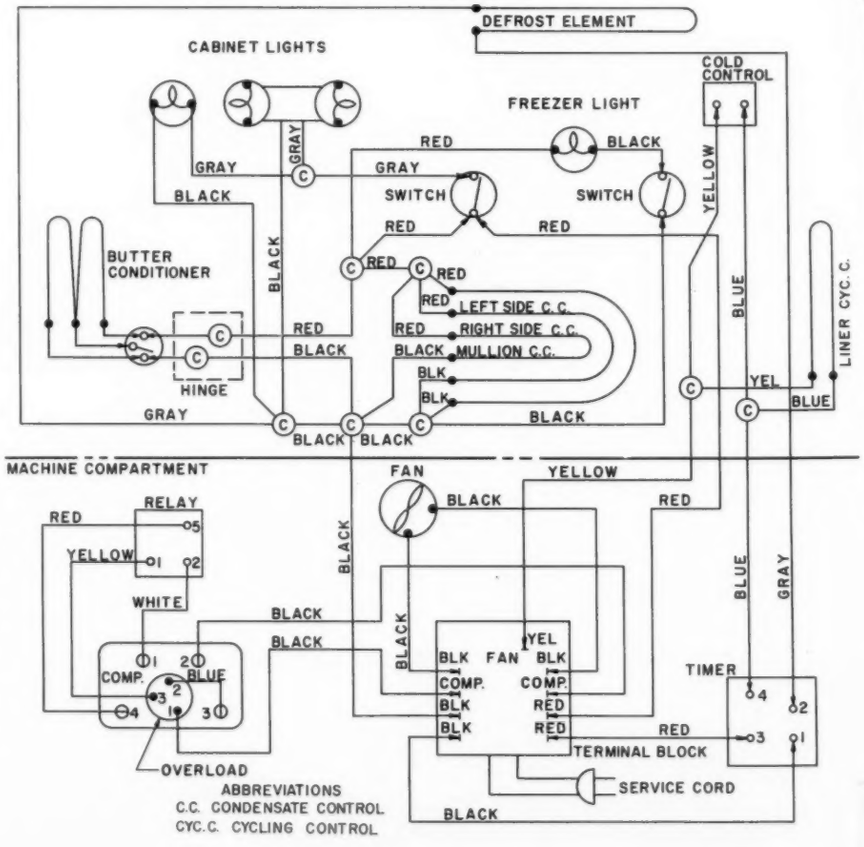
Some of the remaining liquid is vaporized as the liquid passes through the restrictor located inside the tubing at the entrance to the freezer evaporator. The restrictor is a second metering device and effects a correct balance between the amounts of liquid refrigerant producing refrigeration within the cooling coil and within the freezer evaporator. The low-pressure liquid-gas mixture absorbs heat from the freezer compartment as it is pumped to the header at the top rear of the freezer liner.

The header acts as a reservoir for the liquid refrigerant in the system, and retains the liquid as the gas is pumped downward through the suction line to the compressor. The suction line is soldered to the capillary tube, and this junction serves as a "heat exchanger." The warm capillary loses its heat to the gaseous refrigerant being pumped back to the compressor. This provides higher operating efficiency for the system.

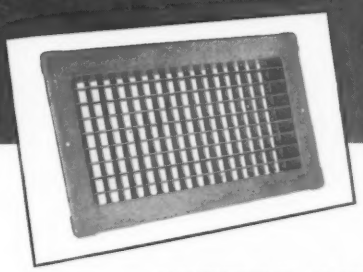


Schematic drawing of the 1/3 hp compressor, relay, and overload protector.

Wiring Diagram for the Space-Age 18



TWO CULPRITS OUTWITTED!



Read How Lima Register Company and Egyptian Teamed Up Against CAUSTIC CLEANING SOLUTIONS AND SALT ATMOSPHERES

WHEN LIMA REGISTER COMPANY was creating their now-famous "Flexi-Trol" air conditioning registers and grilles, Lima contacted EGYPTIAN. Help was needed in solving a double-barreled finishing problem:

Problem #1 — Lima wanted a finish that would resist caustic alkaline cleaning solutions (often sloshed on base board registers by cleaning crews) — and atmospheric salt sprays (responsible for rust, corrosion and peeling, particularly in coastal areas).

Problem #2 — Also essential was a durable finish that would stand up under severe punishment. A particular shade of Beige is Lima's established mark of quality . . . therefore it was imperative that the new coating match other Lima lines perfectly.

Equipped with the facts, Egyptian's topflight research department moved into high gear . . . checked, experimented, tested and came up with the answer: *Coat with an* EGYPTIAN EPOXY TYPE ENAMEL.

THE RESULTS:

- **Costly damage by caustic solutions averted — no peeling experienced in the "Flexi-Trol" line.**
- **Exceptional resistance to salt atmospheres noted — "Flexi-Trol" units scoffed at high humidity and exterior exposure.**
- **Standard Lima color maintained — appearance improved.**
- **Epoxy application required no major change in equipment.**

Take a tip from Lima . . . they put an Egyptian Finishes Specialist on their staff — but not on their payroll!

He's On Your Staff
But Not Your Payroll

It's good sense *to check with an Egyptian Finishes Specialist first . . . His Finishing Know-How can turn* good sense *into SAVED DOLLARS.*

The Egyptian Lacquer Mfg. Company
Box 444, Newark 1, New Jersey

Have an Egyptian Finishes Specialist call on me. I would like his suggestions on:

☐ **Finishing New Product** ☐ **Economizing Our System** ☐ **Improving Our Finish**

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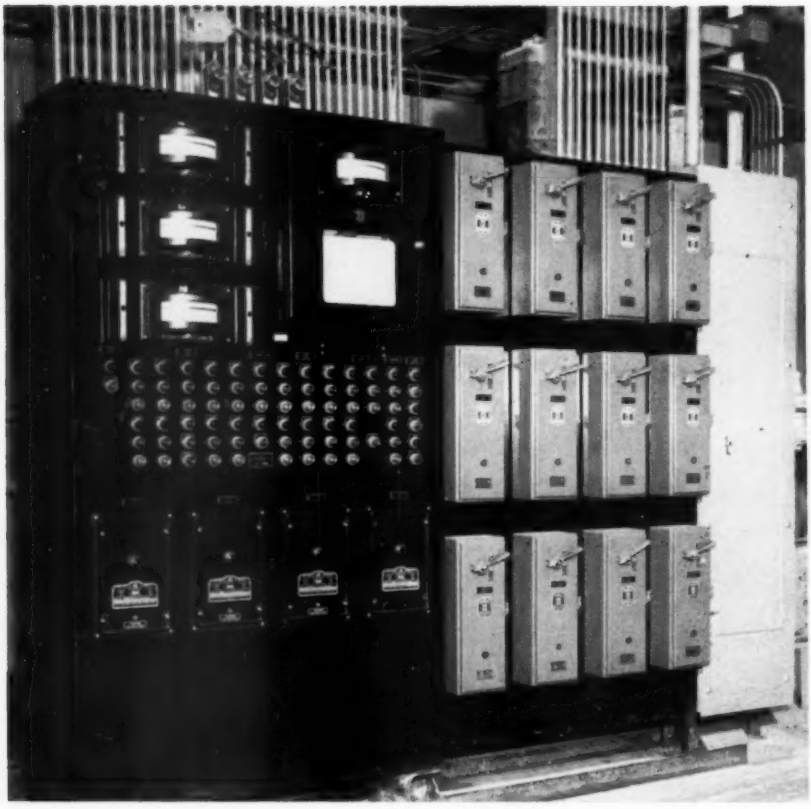


Lima's central control panel, through which cleaning equipment, conveyors, and spray booths are automatically controlled. This panel also controls temperatures in bake oven and solutions in cleaner-phosphatizing system.

Centralized control for a modern organic finishing plant

epoxy finishes, electrostatic spraying, and a complete conveyorized system produce up to 1,000 units per hour

MPM EXCLUSIVE FEATURE

After over two years experience in the use of a modern, centrally and automatically controlled organic finishing system, combined with materials which the company plant executives feel are ideally suited to their type of fabricated product, Lima Register Company, Lima, Ohio, has now released a report on operations and results.

Officials of the company have reported that, through the use of modern equipment and materials, the coatings in use on their air conditioning registers and grilles are "about twice as effective, under comparable conditions of wear and corrosion, as a standard type of enamel previously used."

For the company's products, the finish used must show a high degree of wear resistance, withstand flexing and bending tests, and provide a high degree of rust and corrosion resistance. Company reports indicate that the finish in current use stands the punishing treatment given to test registers long after earlier finishes used break down. According to Lee Beckman, Lima's works manager, tests made under adverse conditions where excessive moisture, salt atmospheres, and even complete immersion over long periods were encountered, the electrostatically-finished registers, using epoxy-type coatings, showed no sign of rusting.

Five-station cleaning, phosphatizing machine

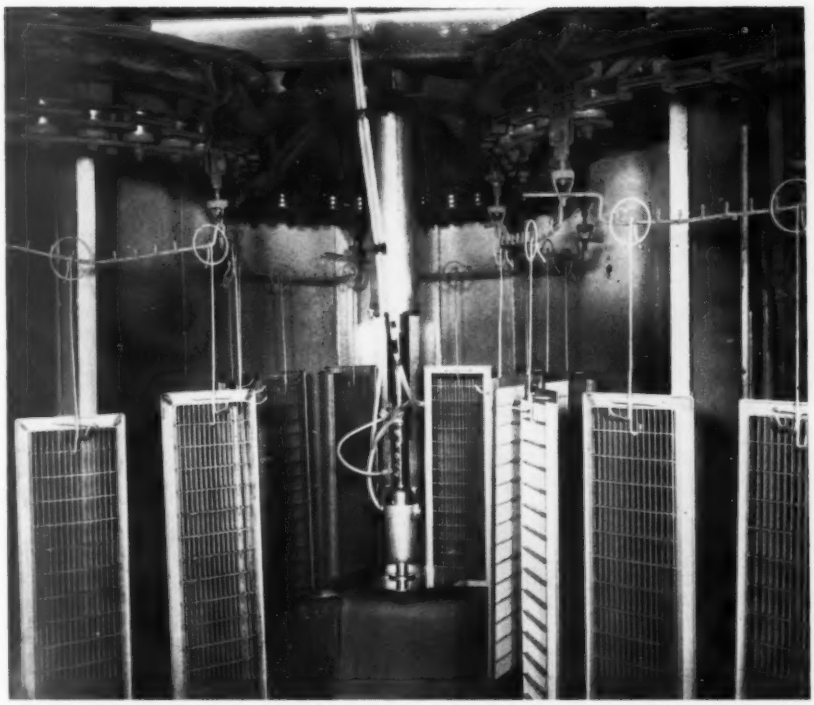
The sequence of finishing operations begins with thorough cleaning of the all-welded registers and grilles, which are made from 20-gauge cold-rolled coiled steel in Lima's modern, well-mechanized plant. Latest type of high speed punch presses and other related fabrication equipment are used to produce register faces, fins, and other components. Assemblies are formed into units of solid one-piece construction on a battery of electronically-controlled resistance welders.

All finishing operations, starting with cleaning and ending with inspection, are performed automatically. A plant-wide conveyor system keeps parts and products flowing through the factory at a production rate of 500 to 1,000 units per hour, depending on type and size. Register parts move at varying heights on a veritable spiderweb of overhead conveyors.

To prepare fabricated parts for painting and baking operations, they are

conveyed through an automatic cleaning-phosphatizing machine for pressure cleaning. The cleaning equipment consists of a five-station machine in which carefully inspected parts are first washed with iron-phosphate cleaner at temperatures between 150° to 170° F. The second station consists of a rinse in iron-phosphate cleaner at the same temperature. Third station is a clear water rinse, and the fourth station consists of a dilute solution of chromic acid, held at approximately 140-170° F. The fifth station consists of a convection dryer.

After forced air dry-off, registers are conveyed to one of two automatic spray booths equipped with electrostatic reciprocating discs, where they are given a single application of beige metallic finish. Directly upon entering booths, registers pass through a 90,000-volt electrostatic field. A uniform finish is produced on all surfaces.



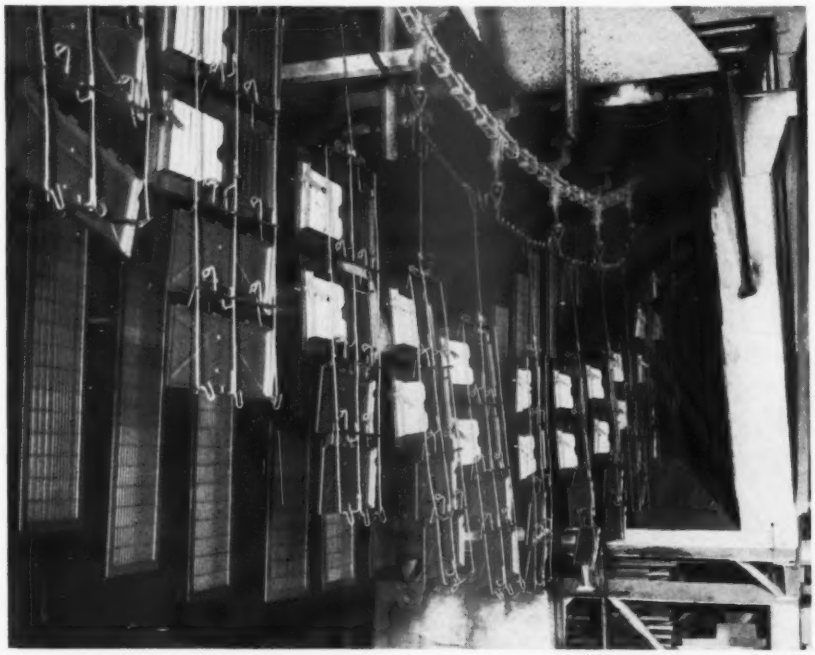
Register parts shown passing through one of two electrostatic spray booths. Reciprocating disc applies a single coat of metallic-base epoxy resin to the registers. No operator is required, except for application of a special "duragold," which calls for an overspray to follow standard finish.

Fifteen-minute baking cycle

Ready for baking, registers are then conveyed to a convection-heated hump-type oven, elevated above a storage area to conserve floor space. This dual-conveyor oven is 144 feet in length. It was built to Beckman's own specifications and is designed to provide well-balanced, carefully-zoned air circulation which can be regulated to change exterior and interior air intake.

This automatic oven, which is heated by gas, is equipped to operate on 15-minute baking cycles at temperatures up to 400° F. Registers first travel 20 feet through the oven for a 2½ minute preheating. Products continue 104 feet for the 15-minute baking operation and then move another 20 feet for a gradual cool-down to 300° F. Leaving the oven, register parts are conveyed 60 feet at room temperature and are then ready for further assembly, if necessary. Finished registers and grilles move directly to packaging stations.

Sprayed registers being conveyed through 144-foot long convection-heated paint baking oven, which is elevated above storage area to conserve floor space. Oven operates on a 12-minute baking cycle at 400° F., and is engineered to control exterior and interior air intake.



The plant maintains portable vacuum cleaning equipment to keep factory interior clean and dust free.

Single control panel

Complete control of all finishing operations is accomplished by a single centrally-located control panel. Lima's five-stage washer, conveying system, electrostatic spray booths, and temperatures in both oven and washer tanks are all controlled automatically from this one central board.

Electrostatic application of the epoxy resin coating has provided a definite production advantage, Beckman asserts, by promoting a tough, uniformly-smooth, mar-resistant finish which the company believes has no peer in the register manufacturing field. This electrostatic finish, Beckman says, also presents a more effective "purchase" for paint, when repainting the registers is required at the point of installation.

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INDUCTION
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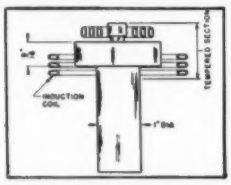
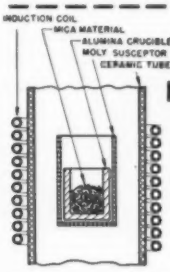
Lepel induction heating equipment represents the most advanced thought in the field of electronics . . . the most practical and efficient source of heat developed for numerous industrial applications.
You are invited to send samples of work with specifications. Our engineers will process and return the completed job with full data and recommendations without cost or obligations

TYPICAL INDUCTION HEATING APPLICATIONS



Punch Heads Selectively Tempered

Diagram shows arrangement for selectively tempering heads of alloy steel punches. The use of a combination type solenoid and pancake induction coil reduces hardness from Rc 55/56 to Rc 41/44, improving resistance to brittle fracture at the head of the punch. In this case a heating cycle of 55 seconds provides uniform tempering. A multiple position fixture, processing 4 pieces at one time, speeds up production.



Heating Non-Conducting Materials To High Temperatures

Laboratory analyses frequently require heating of non-conducting materials to temperatures of 3,000 to 3,500° F. in vacuum or special atmosphere. This can be accomplished by induction heating with the aid of a metal susceptor. Diagram shows the fusion of mica samples in an alumina crucible, using molybdenum susceptor. A ceramic tube surrounding the susceptor isolates the work for fusion in a vacuum. The molybdenum susceptor is heated by induction, which in turn, heats the crucible by radiation.

Electronic Tube Generators from 1 kw to 200 kw.
Spark Gap Converters from 2 kw to 30 kw.

WRITE FOR THE NEW LEPEL CATALOG

All Lepel equipment is certified to comply with the requirements of the F.C.C.

LEPEL HIGH FREQUENCY LABORATORIES, INC.
51st STREET and 37th AVENUE, WOODSIDE 77, N. Y.

Cleaning small parts ultrasonically

WOODSIDE SCREW MACHINE CO., Long Island City, N.Y., had long been plagued with the cleaning problem characteristic of screw machine processing . . . how to remove burrs and chips, as well as oil and grease, from small, hard-to-get-at slots, through-holes, and inaccessible, recessed areas.

An ultrasonic cleaning unit solved the problem. In a typical case, a watch jewel bearing was to have a jewel staked to it. The pinion and the hole to receive the pinion had to be microscopically clean, otherwise the parts would bind and cause malfunctioning.

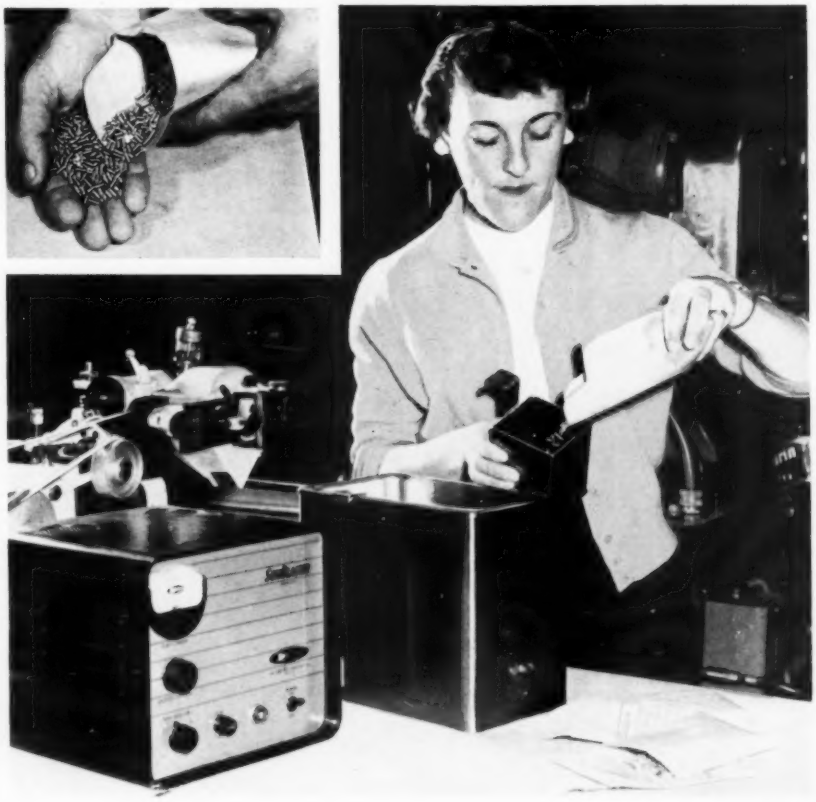
The parts to be cleaned were simply immersed in stainless steel baskets, for about five minutes, in an ultrasonically-agitated solution of trichlorethylene. If the part required deburring, it was left in the solution another ten minutes. Batches were occasionally spot-checked with an eye loupe or projector microscope to be certain that timing and solution were maintained at the desired standards.

The cavitating, or "cold-boiling," action of ultrasonic vibrations is not confined to exposed surfaces alone, but penetrates inter-faces and re-entrant crevices. This is because vacuum bubbles set up by ultrasonic compression 40,000 times per second are of intermolecular size. On the decompression cycle they collapse, or implode, with a force of hundreds of atmospheres, literally blasting the soil from the part.

The accepted theory of burr removal ultrasonically is that burrs are small enough to react to ultrasonic impulses. By vibrating thousands of times per second, they break off as they work-harden and become brittle at the "root."

The Narda "Sonblaster" used by Woodside is a Series 600-3 model, consisting of a 60-watt, average output generator and a one-gallon, stainless steel tank with integral transducer. An on-off switch actuates the generator, which is plugged into any convenient wall outlet. The unit is said to consume no more current than an ordinary light bulb.

Basket is filled with precision jewel bearings for ultrasonic cleaning. Cleaner replaces earlier methods of agitation, tumbling, and air blasting with the help of kerosene and similar solvents. (Inset) — Jewel bearings after cleaning. Parts are shiny and free of grease, and chips and burrs have been removed from crevices, etc.



Ferro ONE-COAT Porcelain enamels

for "special" and non-premium steels

SPECIAL STEEL "A" (Armco Steel)

SPECIAL STEEL "C" (Inland Tinamel)

SPECIAL STEEL "B" (Bethlehem Steel)

REGULAR COLD-ROLLED, RIMMED STEEL

SPECIAL STEEL "D" (U. S. Steel)

What is Best for your products?

See and compare the fine *one-coat* porcelain enamel finishes developed by Ferro over the past ten years. They may be used with a variety of steels, as shown above, each of which has been thoroughly tested if not already in commercial production. While processing techniques may differ, any one of these steels can be used to obtain a high-quality porcelain enamel finish with *one-coat* at substantial savings.

Ferro's most recent process, widely publicized in recent months, makes possible the use of *non-premium* steels for these superior one-coat finishes. This, of course, means lower material costs and wider sources of steel supply.

Whichever base metal *you* may select, you will find Ferro's experience and production-proved products extremely valuable in adapting *one-coat* porcelain enamels to your products, your production facilities. When can we talk to you about it?

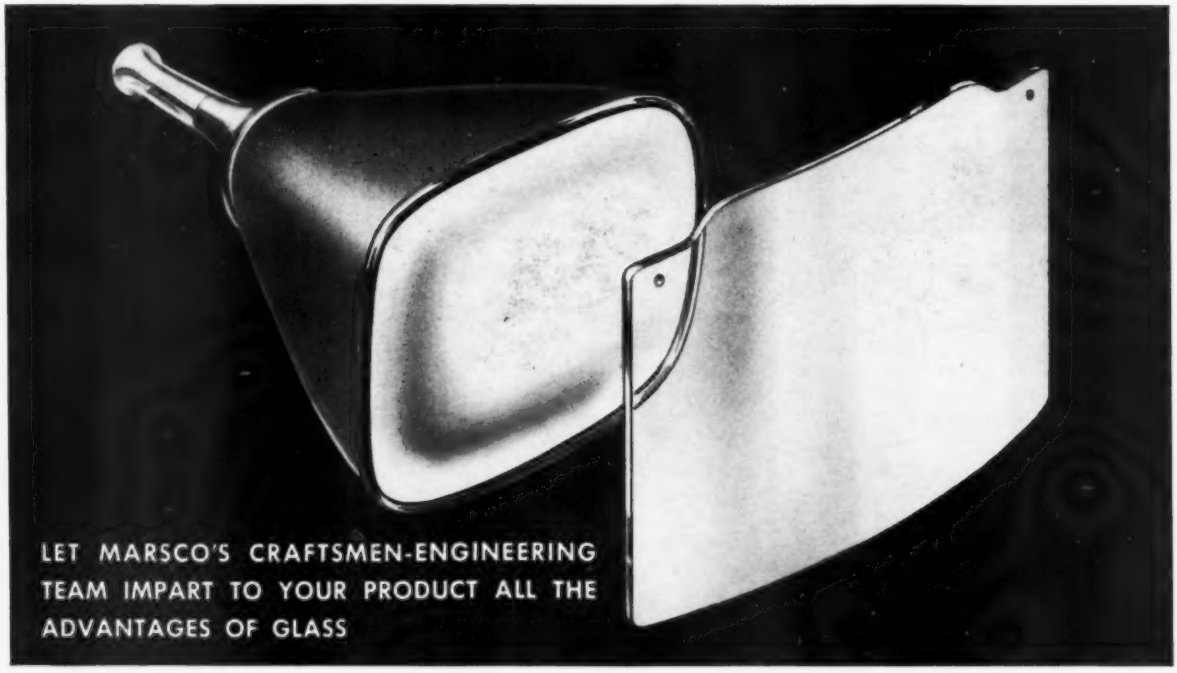
FERRO

FERRO CORPORATION

4150 East 56th Street · Cleveland 5, Ohio
Nashville 11, Tenn. · Los Angeles 39, Calif.

MARSCO

for the Finest in PRECISION GLASS PARTS!



Join the television and appliance manufacturers who are now enjoying extra sales from the appeal and prestige contributed thru the luster of glass. Glass will enhance the beauty and broaden the acceptance of your product. It can be hardened, heat-treated or tempered to survive your consumer usage unscathed.

Here are some of the applications for Marsco heat-treated, tempered and hardened glass parts:

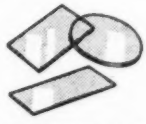
•CLOCK & TIMER CRYSTALS •OVEN DOORS •RADAR EQUIPMENT •AIRCRAFT ACCESSORIES •PHOTOGRAPHIC EQUIPMENT •LIGHT LENSES •DIALS & NAME PLATES •TELEVISION EQUIPMENT •INSTRUMENTS •MEDICAL EQUIPMENT •BACKGUARD GLASS FOR RANGES •LAMP GLASS •SHELVING

Special Shapes for: Instruments, Gauges, Household and Industrial Appliances.

Marsco

Bent Glass

Convex Glass


Heat-treated Glass

MARSCO MFG. CO., 2909 S. HALSTED ST., CHICAGO 8, ILL.

Something new in air conditioning

T. T. ARDEN, president of Robertshaw-Fulton Controls Company, announced that negotiations have been concluded giving his firm an exclusive license to manufacture and market a unique new kind of "cold" making machine, called a free-piston refrigerant compressor.

The unit, claimed to be completely competitive with present cooling systems, is designed to utilize the availability of gas during the summer months when the fuel is not being used for its chief home application, central heating.

The device is a combination of a simple internal combustion engine and refrigerant compressor in a single unit having only one moving part. It is designed to handle the commonly-used refrigerants.

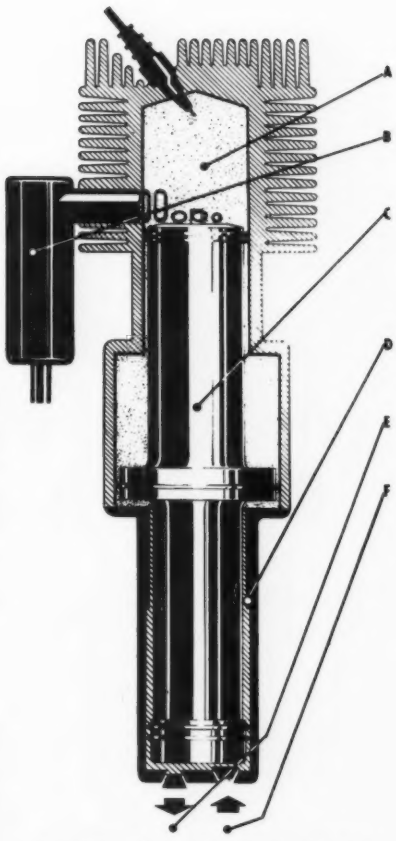
The piston is called "free" because there are not mechanical links from it to the use of power. Combustion of gas takes place at one end of the cylinder, and compression of the refrigerant takes place at the other. From this point, cooling action is the same as in the conventional air conditioning unit.

Principles upon which the machine operates were invented by scientists at Battelle Memorial Institute, Columbus, Ohio, under a project sponsored by a special fund administered by the American Gas Association.

The invention represents several years' research and development, and is covered by a number of patent applications. The patents, as issued, will be owned by Battelle Development Corporation, grantor of the license to Robertshaw. The agreement gives the controls firm an exclusive license, with the right to grant sub-licenses, to manufacture, use, and sell the unit throughout the world, in sizes up to 20 tons of refrigeration capacity.

Prototypes tested for home use

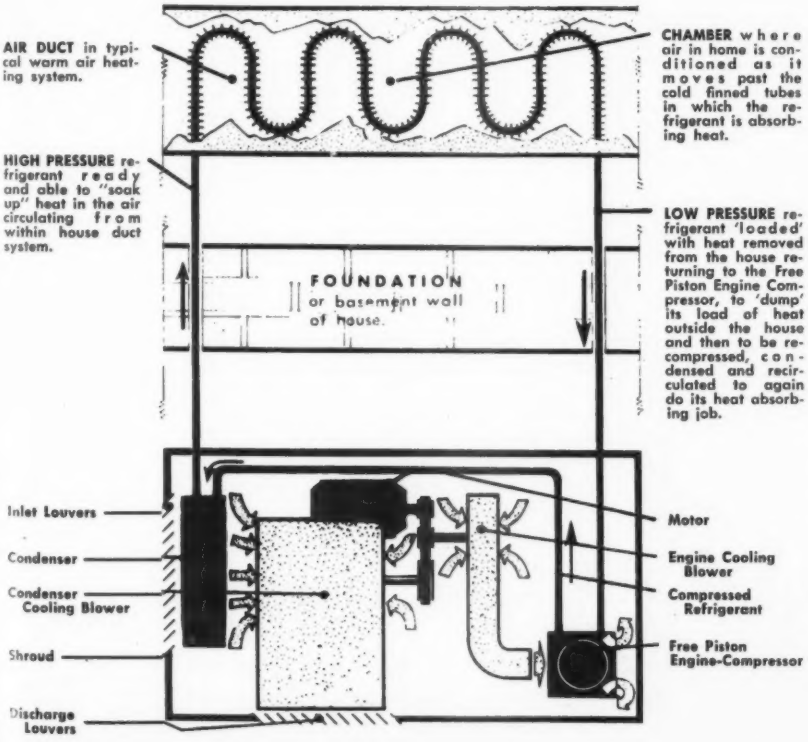
Prototypes have been built and have successfully operated a typical air conditioning system such as is used in homes. Robertshaw is sponsoring continuing research and development work at Battelle Memorial Institute and will devote a substantial portion of its own research and development facilities to incorporate the inventions in a commercial unit which can readily be used by any manufacturer of air conditioning systems.



COMPONENTS AND OPERATION OF FREE-PISTON REFRIGERANT COMPRESSOR

(A) POWER CYLINDER — About the same bore as in lawn mower engines, where natural gas, LP gas, or gasoline is burned. (B) MUFFLER. (C) FREE PISTON — Compresses refrigerant on each down stroke. (D) COMPRESSOR. (E) REFRIGERANT TO CONDENSER — Compressed refrigerant is cooled, condensed, and then sent to evaporator. (F) REFRIGERANT FROM EVAPORATOR — Finned tubing in the house air circulating system where house heat is absorbed.

SCHEMATIC OF COOLING SYSTEM


AIR DUCT in typical warm air heating system.
CHAMBER where air in home is conditioned as it moves past the cold finned tubes in which the refrigerant is absorbing heat.
HIGH PRESSURE refrigerant ready and able to "soak up" heat in the air circulating from within house duct system.
LOW PRESSURE refrigerant 'loaded' with heat removed from the house returning to the Free Piston Engine Compressor, to 'dump' its load of heat outside the house and then to be recompressed, condensed and recirculated to again do its heat absorbing job.
FOUNDATION or basement wall of house.
Inlet Louvers
Condenser
Condenser Cooling Blower
Shroud
Discharge Louvers
Motor
Engine Cooling Blower
Compressed Refrigerant
Free Piston Engine-Compressor

Simplicity of the free-piston refrigerant compressor is expected to permit manufacture of a unit completely competitive with any other air conditioning, including electric motor driven units, as to first cost, dependability, and quietness of operation, the report states. In addition, in most parts of the U. S., low operating costs are expected to be a distinct advantage.

The compressor engine runs on natural gas, bottled gas, and with minor modification, on ordinary automotive gasoline.

Advantages of the unit, Arden stated, indicate that it may enjoy substantial acceptance and usage in air condition-

to Page 66 →

Another new Wyandotte research-developed

metal-cleaning product!

NEW NORDALL emulsion cleaner locks out rust safely!

Here is a remarkable new emulsion cleaner that protects against rust longer — and without fire hazard, too! . . . Wyandotte's NEW NORDALL®!

Designed for spray cleaning steel, cast iron, and other metals either hot or cold, NEW NORDALL protects for up to *six weeks* in plant atmospheres. Perfectly suited for rust prevention between machining operations!

Non-evaporating even at high temperatures, NEW NORDALL is non-foaming in high-pressure, turbulent washers. And NEW NORDALL has a higher, very safe flash point — over 300° F! And it's nontoxic and essentially odorless.

For details of this extraordinary rust-proofing emulsion cleaner, call in your Wyandotte representative soon. TODAY, perhaps? *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*

Other new Wyandotte products

MIL-ETCH®—Caustic-type aluminum etchant eliminates scale, produces bright matte finish, reduces maintenance.

MAXAMP*—Free-flowing, 100%-soluble steel electrocleaner offers maximum detergency, superior smut removal. Also used for zinc phosphate removal; chromium-plate stripping.

FERLON®—Alkaline derusting compound removes rust, light scale, oil, grease, paint, smut without harm to ferrous metals.

BUFSOL—The all-soluble product that lets you remove stubborn buffing compounds the modern, trouble-free way — without solvents.

*TRADEMARK

Wyandotte CHEMICALS

REG. U. S. PAT. OFF.

J. B. FORD DIVISION

The Best in Chemical Products for Metal Finishing

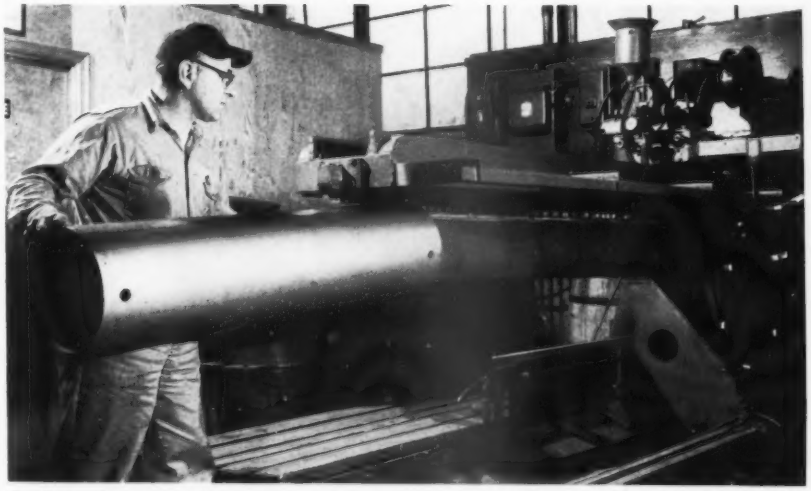
Automatic welding of water softener tanks

GENERAL IONICS CORP., Pittsburgh, fabricates water softener tanks for home and industry. Their use of a novel welding process on these tanks has recently prompted the company to raise their warranty of the stainless steel tanks from 10 to 20 years.

First, the tank is tack-welded at three points. Next, it is placed on a submerged-arc, automatic welding machine for the final center seam weld at a rate of 40 inches per minute. A Type ST-100 flux, fed from the tube in front of the weld-point, keeps atmosphere away from the weld and acts as a stabilizing agent. Type 308 filler rod is fed from a variable speed wheel. Later the weld is buffed.

(Left) — Water softener tank of stainless steel is welded at the rate of 40 inches per minute by this welder. Flux, fed from tube in front of weld point, keeps atmosphere away from the weld and acts as a stabilizing agent.

PHOTOS COURTESY ALLEGHENY LUDLUM STEEL CORP.



Tank is placed on this submerged-arc automatic welding machine for final center seam weld. Previous to this operation, tank was tack-welded at three points.

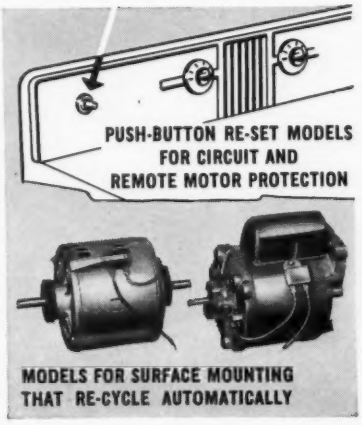
☆ **LOOK FOR FEBRUARY MPM**
JAMMED WITH EDITORIAL FEATURES
AND
ALL THE "REGULAR" ADVERTISERS PLUS A FINE LIST OF BIG NAME COMPANIES APPEARING FOR THE FIRST TIME IN 1960 MPM

☆ **LOOK FOR MARCH MPM**
A SURPRISE EDITORIAL "PACKAGE" COVERING ONE OF THE COUNTRY'S LEADING MULTI-PRODUCT APPLIANCE MANUFACTURING COMPANIES

Protect your motors and circuits with

MP MINI-BREAKER®

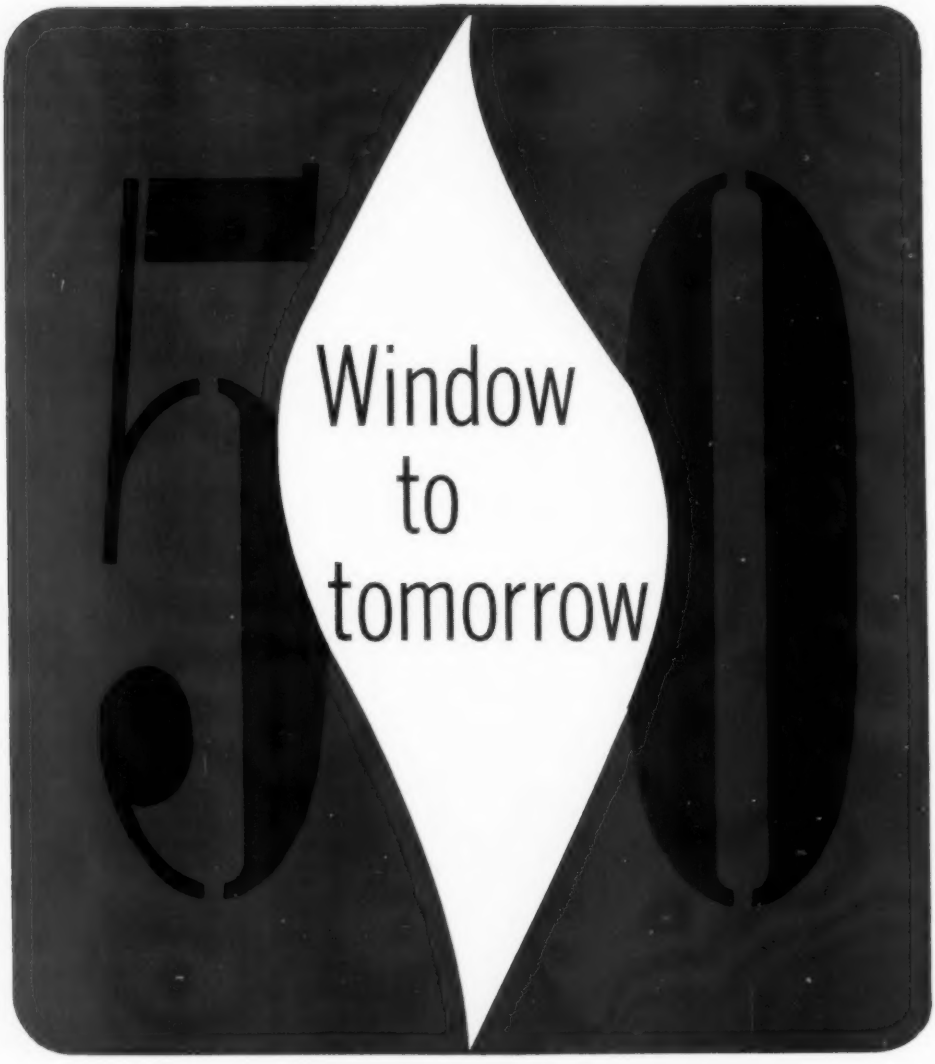
17 appliance makers say it really cuts service problems, adds sales spark



Here are sure, positive protectors against motor burn out and dangerous circuit overload. But they can be factory set for any time lag you may desire so normal overloads can be tolerated without nuisance trips. Easy mounting without harness saves money. Ratings to suit every appliance.

WRITE FOR NEW MINI-BREAKER. MOTOR & CIRCUIT PROTECTION CATALOG

MECHANICAL PRODUCTS, Inc.
1824 RIVER ST., JACKSON, MICH.



The course of things to come often can be foretold by looking at the past. On the basis of Pemco's fifty years of service to the ceramic industry, a prediction can be made . . . as new products and processes appear in the world of ceramics, Pemco will be responsible for many of them.

In the next 50 years, continue to look to Pemco for leadership . . . in research . . . in process development . . . in products . . . in service.

50 YEARS OF RESEARCH AND A FLAME

PEMCO

BALTIMORE 24, MARYLAND

High Quality Porcelain Enamel Frits and Coloring Oxides

Rheem Plans to Acquire Control of Ruud Mfg. Co.

Rheem Mfg. Co. and Ruud Mfg. Co. have reached an agreement whereby Rheem would acquire control of Ruud, it was announced by A. Lightfoot Walker, president of Rheem, and Milton G. Hulme, chairman of Ruud.

Rheem will make an offer to Ruud shareholders under which Rheem has the option to use a combination of cash and Rheem common shares to purchase Ruud shares. The total valuation of Ruud shares would approximate $2.5 million.

Ruud, established in 1889, has headquarters and main plant facilities at Kalamazoo, Mich. There is a Canadian operation at Mimico, a suburb of Toronto. Rheem plans to continue full operation of Ruud facilities.

Toastmaster Executive to head Electric Housewares Section

S. C. Rexinger, Elgin, Ill., sales manager, Electric Housewares Department, Toastmaster Div., McGraw-Edison Co., has been elected chairman of the *Electric Housewares Section* of the National Electrical Manufacturers Assn., it is announced by Joseph F. Miller, NEMA managing director.

Rexinger is a veteran of 27 years in the appliance industry, having been associated with Toastmaster since 1938. During his early years with the company he served successively as sales representative, district manager, and sales manager for the Toastmaster commercial cooking equipment department. He was appointed sales manager for the electric housewares department in 1952. Since that time, the company has expanded its domestic electric housewares line from toasters only to a total of 21 consumer appliances.

A former vice chairman and head of the Section's Sales Promotion Committee, Rexinger succeeds Arnold O. Wolf, Racine, Wis., vice president and general manager, Hamilton Beach Co., Div. of Scovill Mfg. Co. Wolf was named to represent the Section on the board of directors of the Association's newly-proposed *Consumer Products Div.*

Fedders Corp. Profit Up

A Fedders Corp. report to stockholders for the fiscal year ending August 31, 1959 showed company net sales had increased from $53,977,921 to $55,500,644. While the sales rise represented only 2.8 per cent, net profits rose 37.3 per cent.

Lennox Reports Increase in Heating, Cooling Unit Sales

Lennox Industries, Inc., Marshalltown, Iowa, manufacturers of central residential forced air heating and cooling equipment, have announced a 41-per cent increase in sales of heating units, and a 58-per cent increase in cooling units in 1959 over 1958.

John W. Norris, president of the firm, was cautious in his predictions for 1960, however, saying only that he "Hoped that the level of activity achieved in 1959 would be maintained in 1960."

Universal Match Co. to Acquire Wrought Iron Range

Negotiations have been concluded for the acquisition of Wrought Iron Range Co. by Universal Match Corp., it was announced by John L. Wilson, president of Universal. The acquisition will take place through a stock transfer by which 150,000 shares of Wrought Iron Range will be exchanged for 46,800 shares of Universal Match Corp. common stock.

Wrought Iron Range was founded by H. H. Culver, and began making wood burning stoves in 1864. The company specializes in kitchen equipment and other appliances for farms, and does business in metal fabrication.

Wilson also announced that E. R. Culver III, a vice president of Wrought Iron Range, will remain as a vice president of the company under the new set-up. The company employs about 200 persons and is located at 5661 Natural Bridge Ave., St. Louis.

Norge Records Big Sales Year

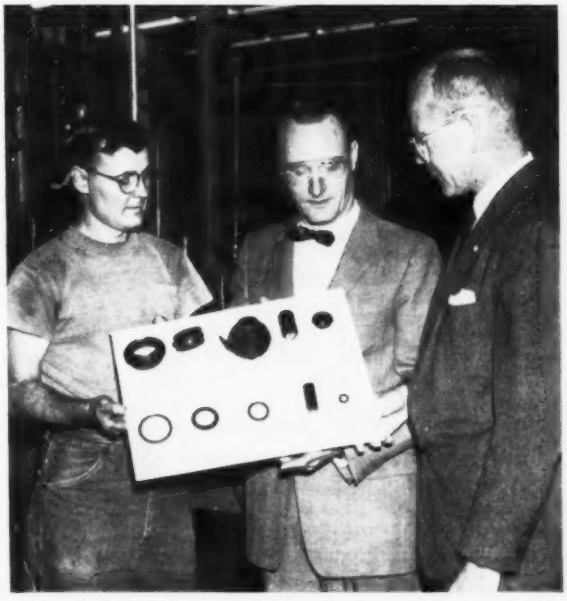
Factory sales of Norge home appliances in November exceeded 104,000 units, setting an alltime mark for the second consecutive month. The former high month was October, when 103,000 appliances were sold.

Judson S. Sayre, president of the Norge Division of Borg-Warner, attrib-

Maytag Presents Work Simplification Award

A maximum $1,500 award has been made jointly under the Maytag Company's work simplification program to Joe E. Henderson of the sheet metal and rubber department, and Larry Beals, a former employe now attending an International Business Machine school in Portland, Ore.

The award was based on the suggestion to salvage, rather than scrap, metal components of parts molded in rubber from the metal components.



President Fred Maytag discusses the award-winning idea with Joe Henderson (left) and Don D. Duven (center), superintendent of sheet metal and rubber. They hold a board displaying the five parts where the idea is being applied — the bottom row showing the metal components salvaged from the corresponding molded rubber parts in the top row. The $1,500 check brings to 17 the number of maximum awards given to employes since the work simplification program was initiated at Maytag in 1949, according to company officials.

uted the new record to "Vigorous consumer demand parlayed with national merchandising and advertising programs. . . . This is only the third 100,000-unit month in Norge history going back to 1927," he added.

"Barring unforeseen developments, we will have shipped slightly under one million units this year and surpass the record 1955 unit total," Sayre predicted. "We're sold out well into the first half of 1960," he continued.

"Appliances showed substantial increases across the board. Automatic washers soared 90 per cent ahead of November last year. Other individual appliances showing strong increases were refrigerators, with a 70-per cent jump over last year, and clothes dryers, 64 per cent ahead," he concluded.

E. Hogenson Dies

Emanuel Hogenson, former executive vice president of Chicago Vitreous Corp., Cicero, Ill., passed away on November 26, 1959 at the age of 71. A native-born Chicagoan, Mr. Hogenson, along with his father and his brother William, founded Chicago Vitreous Corp., manufacturers of porcelain enamel frit, in 1918. In 1956, the firm became a division of the Eagle-Picher Co., Cincinnati, Ohio.

Two NEMA Committee Appointments Made

W. E. Thomas, manager, sales and market analysis department, Allis-Chalmers Mfg. Co., Milwaukee, Wis., has been appointed to serve on the NEMA Statistical committee.

William G. Handfield of the Philco Corp., Philadelphia, Pa., has been appointed a member of the NEMA Excise Tax committee.

Whitney Tool Buys Shear and Press Line

The Whitney Metal Tool Co. announces purchase of the Throatless Shear and Cam Press Line as manufactured by Marshalltown Mfg. Co.

The Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill., will continue the manufacturing of this line, offering sales and service from their Rockford office.

Catalina Refrigerator Company

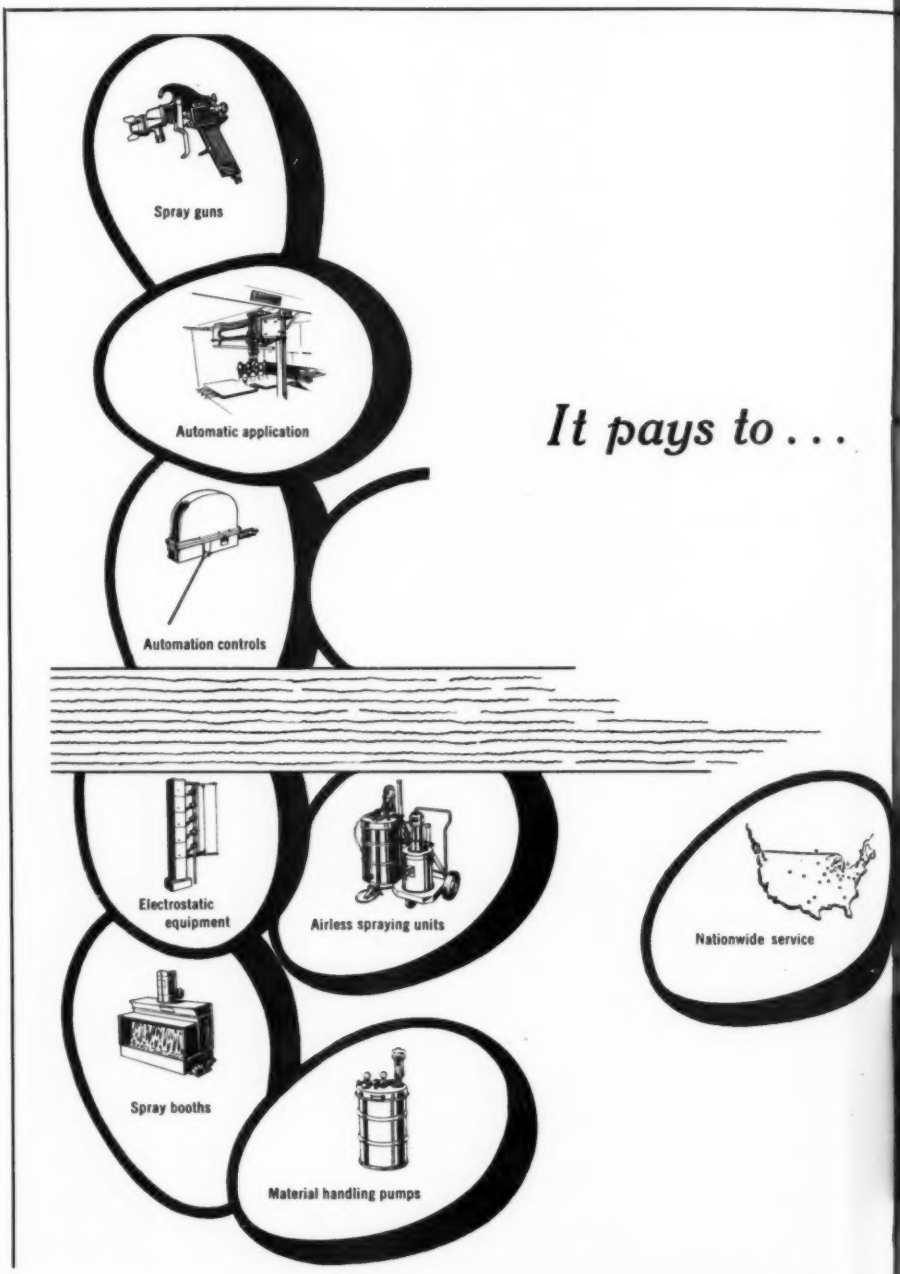
The company formerly known as Ward Refrigerator Co., Inc., 6501 S. Alameda St., Los Angeles 1, Calif., is now Catalina Refrigerator Co., Inc., 6612 S. Wilson Ave., Los Angeles 1. The trade name is "Monterey."

Whirlpool Production Up Despite Steel Shortage

"Production and shipment of electric and gas home appliances manufactured by the Whirlpool Corp. have been generally on or ahead of schedule since the beginning of the national steel strike in mid-July, and we expect to continue to meet all commitments through the 80-day Taft-Hartley injunction period," Elisha Gray II, Whirlpool chairman of the board, announced December 1.

He emphasized that, despite problems caused by the strike, Whirlpool has been able to meet all its commitments both to Sears, Roebuck & Co. and independent wholesale distributors marketing the RCA Whirlpool brand more efficiently than in 1958. "In fact," he said, "advance planning enabled us to materially increase production to meet stepped-up consumer and retailer demand during the five months of July through November. As an example, factory shipments of automatic washers during this period were up an average of 23 per cent each month over the first half of the year, and refrigerator shipments during the same five months averaged 18 per cent ahead of the first-half monthly average.

"Barring a renewal of the strike," Gray concluded, "it looks now that, even with expected delays in a resump-



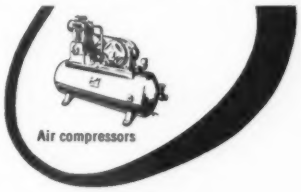
tion of a full flow of steel from the mills, our customers can expect little or no interruption in scheduled shipments of home appliances manufactured by Whirlpool."

Maintenance, Engineering Show to be Largest in its History

The largest Plant Maintenance & Engineering Show in the 11-year history of the exposition will take place at Convention Hall, Philadelphia, Jan. 25-28. Exhibit space, which will cover five acres, will be 20-per cent greater than last year, according to Clapp & Poliak, Inc., N. Y., the exposition management.

Four hundred companies will exhibit and about 20,000 visitors are expected from some thirty countries. The show is one of the three largest annual industrial expositions in the country.

Accompanying the show will be the 11th annual Plant Maintenance & Engineering Conference, one of the largest engineering conferences of the year. More than 2,000 engineers will hear 71 speakers address 43 sessions. These speakers are drawn from a broad industrial and geographical cross section. They come from 52 companies, in 20 basic industries, located in 19 states and three Canadian provinces.



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Expect 12,000 Buyers at Housewares Show

More than 12,000 buyers are expected to register at the 32nd National Housewares Exhibit of the National Housewares Manufacturers Association at Chicago's Navy Pier and adjacent Drill Hall January 11-15, according to Dolph Zapfel, secretary of NHMA.

"Increased buyer requests for advance registration and a total of 734 exhibitors scheduled to show the bulk of the nation's housewares production indicate a record-breaking registration," Zapfel said. "The return of advance registration cards by buyers is about 10 per cent ahead of this time a year ago."

A total of 11,700 buyers registered for the January, 1959 Exhibit.

Return of the advance registration cards assures buyers they will receive a personal admittance badge to the Exhibit by mail, enabling them to go directly into the Exhibit without stopping in the registration area at Navy Pier or Drill Hall.

It is expected that almost 2,000 buyers will come from the nation's department stores, and more than 3,000 from housewares-hardware distributing firms across the country. Buyers in other merchandising categories will include those from electrical housewares distributors, appliance retailers, and other miscellaneous categories.

All show visitors will be offered free bus service by the NHMA. Buses will operate at five-minute intervals each day from Loop and near-North hotels to Navy Pier.

375 Companies Signed for Design Engineering Show

The Design Engineering Show, an exposition devoted to the research and development of new products, will occupy all four floors of the New York Coliseum during a four-day run, May 23-26.

Three hundred seventy-five nationally-known companies have contracted for exhibit space, and it is expected that the final number will be well over 400, according to the exposition management.

During the same four days, the machine design division of the American Society of Mechanical Engineers will sponsor its annual Design Engineering Conference, also at the Coliseum.

Although admission is limited to those with major responsibilities for the design of new products, more than 20,000 major executives and engineers are expected to attend.

more News →

Hassenplug to Board, Robertson to Vice President at Acme

Election of Walter M. Hassenplug to the board of directors of Acme Industries, Inc., manufacturers of refrigeration and air conditioning systems, has been announced by Kenneth A. Weatherwax, president. Hassenplug is an executive vice president of Acme. A simultaneous announcement reports Robert C. Robertson being advanced from director of sales to vice president in charge of sales at Acme.

Robertson has been with Acme since 1957 as director of sales after more than thirty years in sales management posts with Chrysler Airtemp, General Electric, Carrier, etc. Hassenplug has been a vice president and the company's director of engineering since 1956. Former positions were at Ingersoll-Rand Co., Carrier Corp., and General Electric.

REF Announces New Plant

REF Mfg. Corp. has just announced an addition to its plant in Mineola, L. I. REF designs and fabricates electro-mechanical devices, and the company is best known for its "Skygalley" and "Whirlwind" food service installations for aircraft.

Ideal
HUDEE SINK FRAMES

...offer WIDER SELECTION
...with MORE VERSATILITY
...for EASIER INSTALLATION

PATENT NOS.
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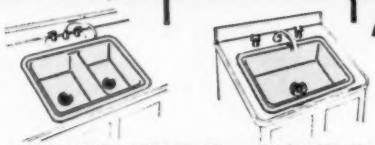
FRAMES FOR ALL FLAT RIM SINKS | IN STAINLESS STEEL OR ALUMINUM | HUDEE IS the Original WATERTIGHT CLAMP-DOWN SINK FRAME SYSTEM



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New Infra-red Oven Company Formed

Four veterans in the infra-red field have disassociated themselves from former connections and have formed a new company under the name of Barber Infra-red Associates. The combined experience of these four men, which includes I. H. Barber, P. H. Krupp, M. M. Might and J. R. Pigman, totals almost 70 years.

Barber entered the infra-red field in 1943, Krupp in 1941, and Pigman's experience in infra-red also dates from 1941. Might's activities for the past sixteen years have been in infra-red work.

The report states that Barber Infra-red Associates will be located in a manufacturing plant at Bradner, Ohio, near Toledo, and that the company will be active in all of the various industries where infra-red is applicable, including higher temperature furnaces for applications in excess of 1000° F.

MIGHT

BARBER

PIGMAN

KRUPP

New Welding Machinery Group

"The newly-formed Automatic Welding Machinery Association does not overlap the function of any of the other groups in the welding field, and because of this, has a most important role to play." So says E. W. Hollis, president of AWMA. Hollis is also vice president of the Lewis Welding Co., Cleveland.

In commenting on the new trade group, Hollis reported that "It is the purpose of the association to draw the technical and management personnel of automatic welding machinery manufacturers together to provide better user understanding of the use of such equip-

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...a new name to reflect the increasing scope of our activities in the field of industrial finishes; a name which we believe to be indicative of our emphasis on creative research and basic polymer chemistry—one more descriptive of our technological potential and our program for future growth—
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ment, and also to create uniform nomenclature, engineering standards, and methods of rating for this equipment.

"Certainly there can be little justification for this association if it is a duplication of other established groups, but this is hardly true," he points out. "Fusion welding has become an integral part of more and more production operations, and making welding more automatic and repetitive is essential from the standpoint of both cost and quality . . . "

Mueller Climatrol Sales Up For '59

H. P. Mueller, Jr., executive vice president, Mueller Climatrol Div., Worthington Corp., reported, "Consolidated sales of its Milwaukee, Wis., and Alhambra, Calif., facilities compared favorably with performance of a year ago and with the residential heating and air conditioning industry." Mueller also stated, "Mueller Climatrol gas furnace sales were up 30 per cent as compared to 1958, while the industry increased by 25 per cent." He further commented that Mueller increased in cooling unit sales by 54 per cent, while the industry is estimated to increase by approximately 45 per cent.

Home Laundry Appliance Sales Up 11% For First 10 Months '59

The American Home Laundry Manufacturers' Assn. reports factory sales of home laundry appliances up 11 per cent for the first ten months of 1959, compared with the comparable months of 1958. There was a slight drop in October to 578,602 units, 3 per cent under the preceding month and 5 per cent less than October, 1958. Sales for October by individual products were: combination washer-dryers, 24,798 units — up 28 per cent for the ten months; automatic and semi-automatic washers, 282,415 units — up 10 per cent for the period; wringer and all other washers, 91,720 units — up 3 per cent for the period; electric dryers, 110,834 units— up 15 per cent; and gas dryers, 68,835 units — up 29 per cent.

Cleveland Heater Buys Mustee Heater Co.

The Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, Ohio, has purchased the inventory, tools, and dies of the Mustee Heater Co., Cleveland.

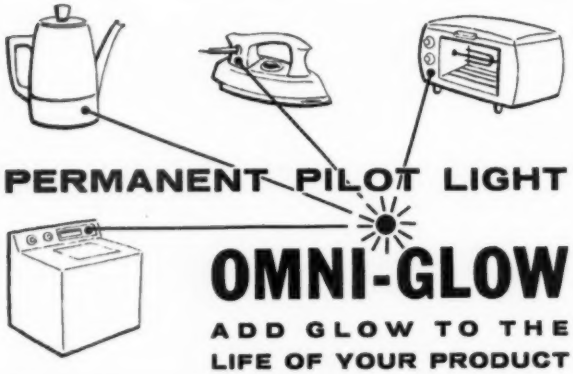
Fifty-three year old manufacturers of the REX line of gas and electric domestic and commercial water heaters, The Cleveland Heater Co. will add the X-Flue Rocket series to their line. For the present, no changes are anticipated in the REX XXLR, CASCADE, VICTOR or TABLE-TOP series, the report states. All manufacturing facilities will be maintained at The Cleveland Heater Co. factory, 1933 West 114th St., Cleveland.

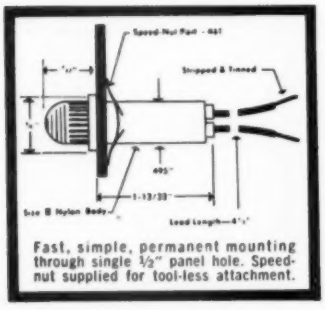
Management personnel at The Cleveland Heater Co. includes Arthur Friedman, president and treasurer; Arthur E. Friedman, vice president; K. V. Ludlow, general sales manager; and G. B. Krause, sales manager, Electric division.

Midland-Ross Corp. Buys Surface Combustion

The Midland-Ross Corp. has announced that it has acquired the Surface Combustion Corp. with headquarters in Toledo and Columbus, Ohio, for $23 million in cash. The announcement follows a report made a month earlier by Wade N. Harris, president of Midland-Ross and Henry M. Heyn, president of Surface, that preliminary negotiations for the acquisition were in progress.

Surface is a leading designer and producer of industrial furnaces and other heating equipment for substantially all industries, "Kathabar" dehumidification systems, and produces Janitrol heating





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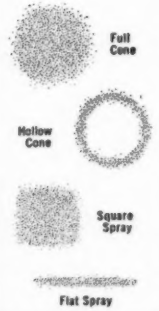

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Out of our laboratories come a wide range of frits used on a wide range of products in our own enameling plant. Here, you have that rare combination of science working hand in hand, day after day, with old man practical experience. This "big edge" is paying off for our Frit Customers.

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LIFETIME
Porcelain Enamel Products

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FRIT
"The Plant Tested Frit"

and air conditioning products for residential, commercial, and industrial use.

Sales of Surface, including Janitrol, have averaged approximately $45 million a year in the last five years. Net profits have averaged in excess of $2 million in the same period. Harris estimated that the sales of the combined organization in 1960 should approximate $120 million.

AHLMA Elects Officers for 1960

Homer L. Travis, chairman of the board of the American Home Laundry Manufacturers' Association, has been reelected for 1960, J. B. Murray, chairman, Nominating committee, announced. Travis is vice president of Kelvinator Sales, Kelvinator Div., American Motors Corp.

Elected as vice chairman was Claire G. Ely, vice president, Marketing, The Maytag Co. He replaces Jack D. Lee, manager, Laundry Equipment department, Westinghouse Electric Corp.

G. M. Sheehan, manager, Finance, Home Laundry department, General Electric Co., was reelected treasurer of the association.

Guenther Baumgart continues as president and chief executive officer.

Other members of the board of directors are:

John M. Mihalic, Jr., president, Avco Corp.
L. O. Reese, president and general manager, Armstrong Products Corp.
E. A. Labisky, general manager, The Barton Corp.
R. H. Smith, vice president in charge of Home Appliance Div., Blackstone Corp.
Parker H. Ericksen, vice president and general manager, Easy Laundry Appliances Div., The Murray Corp. of America.
T. D. Kennedy, Laundry Product sales manager, Frigidaire Div., General Motors Corp.
Fred Holt, general manager, Home Laundry department, General Electric Co.
R. G. Halvorsen, executive vice president, Hamilton Mfg. Co.
E. E. Folsom, general manager, Home Laundry department, Hotpoint Co., Div. of General Electric Co.
Charles E. Mollhagen, president, Ironrite Inc.
Harold P. Bull, vice president, sales, Norge Div., Borg-Warner Corp.
Frank Breckenridge, executive vice president and general manager, O'Keefe & Merritt Co.
William J. Richards, treasurer, One Minute Washer Co.
Harold W. Schaefer, vice president and general manager, Consumer Goods Div., Philco Corp.
J. B. Murray, president, Speed Queen Div., McGraw-Edison Co.
E. N. Stiglitz, president, The Stiglitz Corp., Inc.
Jack D. Lee, manager, Laundry Equipment department, Westinghouse Electric Corp.
Juel M. Ranum, assistant to the chairman of the board and director, Public Relations, Whirlpool Corp.

American Buff Buys Siefen Co.

Ben P. Sax, board chairman of American Buff Co., Chicago, manufacturer of buffs and polishing wheels, has announced the purchase of the J. J. Siefen Co., Detroit, for $500,000 cash.

The Siefen firm makes buffing compounds and spray equipment for the metal finishing industry, and will continue to be operated as a separate facility.

EIA Consumer Products Division Meets

The Consumer Products Div. of Electronics Industries Association will consider recommendations for a "stereophonic" public relations program by its recently-organized Phonograph section. The section held its first meeting on Nov. 18 in New York City and elected L. M. Sandwick, vice president of Pilot Radio Corp., its chairman.

LITTELL Style "M"

The "Install-it-Yourself" Roll Feed That Makes Medium Duty Presses Up to 5 Times More Productive!

Install the Style "M" yourself. Three steps.
1. Cut and thread the connecting rod.
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Simple instructions in Bulletin 702 furnished with your order make installation easy. 5 sizes. Maximum stock widths, 4" to 12". Left to right feed. Feed lengths, 0-2" through 0-4¾" with plain gears, and 0-4½" through 0-8½" with compound gears. Engineered feeds with all parts complete are delivered in 4 weeks.

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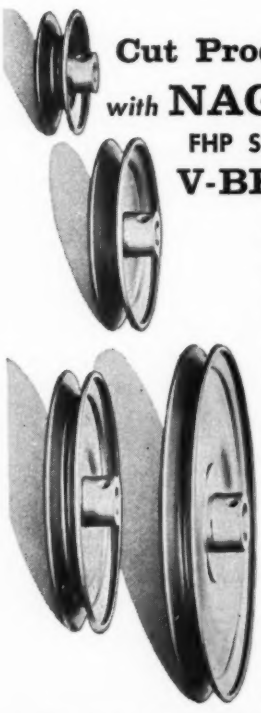

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INDUSTRY PERSONALS

Four promotions within the **Westinghouse** major appliance division have been announced.

F. E. Moquin, formerly merchandise manager of the dehumidifier and water cooler department, has been made manager of the department. He succeeds **Richard Sheetz,** who has been appointed manager of the Westinghouse East Springfield, Mass., works.

Fred E. Maguire, Jr., formerly merchandise manager of the contract sales department in Mansfield, Ohio, has been named merchandise manager of the dehumidifier and water cooler department.

E. H. Van Guelpen, formerly merchandise manager of freezers, has been named merchandise manager of refrigerators, succeeding **Charles Vondran,** recently named manager of the laundry equipment department at Mansfield.

R. F. MacGillivray, formerly district manager of sales promotion and sales training for Westinghouse Appliance Sales at Los Angeles, has been named merchandise manager of freezers.

Daniel J. De Carlo has been appointed manager, **Contract Division, Verson Allsteel Press Co.,** according to an announcement by D. C. Verson, president. De Carlo, who has been with the company for six years as an engineer and, recently, as assistant service manager, will be responsible for Verson's contract machining and fabricating operations.

Robert G. Gustaveson has been appointed vice president and sales manager of **Fort Metlspin, Inc.,** a recently-established metal spinning firm in Fort Atkinson, Wis. Gustaveson came to Fort Metlspin after eight years with Spincraft, Inc., Milwaukee, where he held positions as field engineer and sales manager of the Contract Division. Earlier, he was with the fabricating division of Creamery Package Mfg. Co., Fort Atkinson and, for three years, with Waukesha Metal Fabricating Co.

MAGUIRE

MOQUIN

VAN GUELPEN

MACGILLIVRAY

The O. Hommel Co., Pittsburgh, Pa., has announced the appointment of **Loran F. Smith** as manager of the West Coast district, with offices in Los Angeles. He has been associated with Hommel as a sales-service engineer on the West Coast since 1955 and, in the new position, will continue his former duties. The Hommel firm is a manufacturer of ceramic raw materials.

L. R. Kerns Co., Chicago, manufacturers of lubrication, drawing, cutting, grinding, and cleaning compounds for industry, has announced the appointment of **Thomas E. Thorpe** as manager of technical sales – Rolling Oils division. Thorpe comes to L. R. Kerns Co. from Republic Steel Corp., Gadsden, Ala.

Pemco Corp. has elected **John R. Reuling** a vice president, according to an announcement made by Richard Turk, chairman.

Reuling has been with Pemco since 1936. He started in the accounting department and progressed through a series of promotions to chief accountant, assistant treasurer, and treasurer-controller. He will retain the title of treasurer and controller and will be responsible for all financial affairs of the company.

Link-Belt Co. has announced that **Wayne J. Mitchell** has succeeded Lester T. Graham as district manager at Portland, Ore. The latter has retired after 42 years with Link-Belt and its Pacific Coast predecessor organization. Mitchell joined the company at its Minneapolis plant in 1948 as a designer, and later as assistant to the chief engineer.

James B. Willis has been named director of engineering services at **Pemco Corp.,** according to a recent announcement by Charles P. Lohman, vice president. Willis will act as liaison between field operations and the company's several service laboratories.

John Geyer, manager of the product development department, **Metalworking Chemicals Division, Amchem Products, Inc.,** Ambler, Pa., has been promoted to technical assistant to Amchem's president, Gerald Romig.

Geyer will be succeeded in the product development department by **Hugh Gehman,** who has been his assistant since January, 1955.

The Maytag Co. has named **Mrs. Ruth Krustev,** Des Moines, associate editor of *Successful Farming* magazine, to the position of Linda Marshall home service director, effective January 1, according to an announcement made by Max Fuller, Maytag's director of field education.

In her post with *Successful Farming* for the past five years, she has covered the home appliance field. At Maytag, her duties will involve the development and maintenance of continuing programs of development and testing of all Maytag products from the homemaker's point of view.

Ingersoll Products Division, Borg-Warner Corp., has announced the election of **Howard A. Schmeal** to vice president-treasurer. He has been associated with Ingersoll Products for the last 15 years, starting as controller in 1944. Since then, he has been assigned broader responsibilities of a fiscal nature with Ingersoll Products, with Inger-

to Page 68 →

SMITH

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WILLIS

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Smooth Power

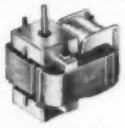
AC MOTORS

1/1800 H.P. TO 1/35 H.P.

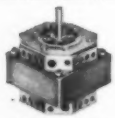
MODEL B
1/80 H.P. to 1/35 H.P.
4-pole, 4-coil shaded pole
AC induction type

. . . for a standard line of motors adaptable to hundreds of applications

MODEL A
1/500 H.P. to
1/45 H.P. 2-pole
shaded pole
AC induction type



MODEL H
1/550 H.P. to
1/50 H.P. 2-pole
shaded pole
AC induction type



MODEL D
1/90 H.P. to
1/45 H.P. 4-pole,
4-coil shaded pole
AC induction type

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General Industries' standard line of motors is adaptable, with slight variations, to literally thousands of applications. This means that your motor requirements can most likely be met without additional time-consuming engineering.

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Something new in air conditioning

→ *from Page 53*

ing for the home, for stores, motels and offices, and for autos, buses, trucks, and aircraft.

Small units for cars by 1961

In 1959, he said, it is estimated that more than 200,000 residential air conditioners (not including window conditioners) and approximately 500,000 automobile air conditioners will have been sold. He pointed out that competent market analysts are forecasting the sale of residential central air conditioners at the annual rate of more than one million units within the next five to ten years.

If only one-third of such residential air conditioners use the free-piston refrigerant compressor and its attendant automatic controls, Arden points out, it will represent a business for Robertshaw embracing a minimum of $35 million in annual sales.

It is hoped, he said, that units suitable for three- to six-ton central home air conditioners and smaller units for automobiles can be brought to the market in 1961.

Present automobile air conditioners, Arden said, are oversize, take up valuable under-hood space, gobble up much engine power, and produce cool air only when the car's engine is running.

A completely separate, small, and compact unit, operating independently of the car's engine, but on the same fuel carried in the gas tank, should be an important forward step, he pointed out.

Gas industry expected to back project

C. S. Stackpole, managing director, American Gas Association, commented, "Entrance of Robertshaw-Fulton into the domestic gas air conditioning field, with a license to produce the revolutionary free-piston engine compressor unit, is an exciting step forward for our industry and the public. This unit's many advantages, including low first cost and economical operation, will prove a boon to homemakers everywhere.

"It is further gratifying to us that the free-piston unit was developed under AGA's PAR Research Program. I am confident that the gas industry will provide strong support for Robertshaw in marketing this important new product."

Robertshaw will manufacture and market the free-piston engine-compressor unit only, Arden said. He believes that the unit can easily be adopted and used by any present manufacturer of air conditioners using conventional refrigerants.

NO. 1 SOURCE OF SUPPLY FOR BURNING TOOLS

Here at Fahralloy we believe in giving service as well as manufacturing top quality heat and corrosion resisting castings. In fact, service is a keystone upon which our business has grown over almost a quarter of a century. Sitting here at the hub of industry in the heart of America we're never more than a few hours away from you at most. No matter what your problem may be if a heat and corrosion resisting casting is involved, you'll find the solution at Fahralloy. Try us and see for yourself.

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- **PUMP MANUFACTURERS**
- **STEEL**

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Personals

→ *from Page 65*

soll Kalamazoo Division, of which he is secretary-treasurer, and Ingersoll-Humphryes Division, of which he is assistant treasurer.

Milton E. Morgan has been appointed a vice president of **A. O. Smith Corp.'s Permaglas Division** in Kankakee, Ill. He has served as corporate purchasing director from 1956 to 1957 and as assistant general sales manager for automotive products prior to that.

Nalco Chemical Co., Chicago, has appointed **Thomas C. Jones** president, it has been announced. **Joseph A. Holmes**, former president, becomes vice chairman of the board of directors.

Glen Honner, formerly manager of the order department at **Toledo Desk & Fixture Co.**, Maumee, Ohio, will assume the responsibilities of plant superintendent, including production, maintenance, and quality control. Honner has been with the company for the past nine years as assistant sales manager and as sales manager of the company's former Crane Kitchen Division.

Revere Copper and Brass, Inc., has announced the appointment of **J. E. Ziegler** as assistant manager-building products of the Pacific Coast division. Concurrently, **J. T. Steele, Jr.**, was appointed district manager of the Seattle district sales office.

Thatcher Furnace Co. has announced the election of **Edward B. Tuttle** to director and vice president of manufacturing. He formerly served as production superintendent at the firm's Garwood, N. J. plant.

Kelvinator Division, American Motors Corp. has announced that **Robert P. King** has been named manager of the appliance warranty department. Robert S. Geran, general service manager, said King joined the company in 1946. He moved to the warranty department in 1951 and has handled appliance warranties for the past eight years.

The Payne Co., La Puente, Calif., manufacturer of heating and air conditioning products, recently announced the appointment of **Glenn Gray** as factory sales engineer, covering portions of east and central Texas, extending into Louisiana.

Precision Welder & Flexopress Ltd. (Canada) has named **William Amos** manager of engineering and sales, and **Albert Moore** manager of manufacturing for the new plant in Toronto. Both men have been closely associated with the manufacturing and marketing of Precision Welders and Flexopresses in Canada for several years.

Selas Corp. of America, Dresher, Pa., has announced the appointment of **Eugene A. Cook, Jr.** to the position of chief engineer. He was formerly with Surface Combustion Co.

In his capacity as head of the company's engineering division, Cook will direct the designing and engineering of heat processing equipment for the steel, metalworking, and other industries served by Selas.

Ingersoll Products Div., Borg-Warner Corp., has elected **Blaz A. Lucas** vice president in charge of sales, it was announced by J. H. Ingersoll, president of the Division.

Lucas has been associated with the division since 1956, serving first as director of procurement, then as factory manager, and later as manager of sales. Before joining Borg-Warner, Lucas was employed by Studebaker-Packard Corp. Prior to this, he was on the Chicago district sales staff of the U. S. Steel Corp.

Conforming Matrix Corp. has announced the appointment of **Gerald D. Minnick** as director of the new semiconductor equipment division. Concurrently, **Leo McHue** has been appointed to the post of vice president.

COOK

KING

MC HUE

MINNICK

AMOS

MOORE

LUCAS

= the Mark of Quality
In Trim Hardware, Your Best Bet Is To Call For Grigoleit
• ALUMINUM TRIM
• DECORATIVE METALS
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. . . all from press or rolled section tools — anodized — chrome plated — painted — silk screened — lithographed. All in our own plant!
For distinctive decorative trim . . . bezels, control panels, escutcheons for ranges, refrigerators, freezers, washers, dryers and combinations. Add eye appeal — buy appeal to your product, choose Grigoleit!
FOR ALL CUSTOM-MADE OR STOCK TOOLED APPLIANCE HARDWARE, CALL ON —
THE GRIGOLEIT COMPANY
Over 30 Years in Plastics
740 E. NORTH ST., DECATUR, ILL.

NEW INDUSTRIAL LITERATURE

"Install-It-Yourself" Roll Feed

This catalog describes a roll feed that is said to make medium duty presses up to five times more productive. There are five sizes. Maximum stock widths, 4 inches to 12 inches. Left to right feed. For a copy of the catalog describing this equipment, write Dept. MPM, F. J. Littell Machine Co., 4143 N. Ravenswood Ave., Chicago 13, Ill.

Ultra-Fine Holes in Ultra-Hard Materials

A brochure illustrating and describing an automatic machine for drilling ultra-fine holes in ultra-hard materials is available from an overseas manufacturer. Called the MP Machine, it is described as permitting automatic drilling of perfectly smooth and regular holes with diameters of .002" and over in all ultra-hard materials such as special alloy steels, drawing dies, ceramics, etc. For your copy, write Dept. MPM, Mecanique et Plastique S. A. 114, rue de Carouge, Geneva, Switzerland.

Electrical Distribution Systems

An eight-page leaflet covering XL BUStribution Duct has been prepared by the manufacturer, and deals with the latest in safety and ease of installation of bus duct systems. Some features of the system are: low voltage drop; 50,000 rms short-circuit rating; single-bolt bar connection; full butyl insulation; ten-foot supporting spans; and compactness. For your copy, write to Dept. MPM, BullDog Electric Products Div., I-T-E Circuit Breaker Co., Box 177, Detroit 32, Mich.

Products for Chemical Cleaning

A technical bulletin covering the most important areas of chemical cleaning, such as power plant, pre-operational, and operational, has been issued. Subjects such as corrosion, copper deposits, stainless steel cleaning, cleaning aluminum metal and aluminum alloys, etc., are dealt with in detail. For your copy of Technical Bulletin No. 102, write Dept. MPM, Chas. Pfizer & Co., Inc., Chemical Sales Div., 630 Flushing Ave., Brooklyn 6, N. Y.

Catalog on Die Base

A catalog describing a new type of die base for this company's Type "CJ" hole punching units, which is said to cut replacement costs of round and shaped dies by approximately 50 per cent, is available on request. A complete description of the die base, which replaces the previous one-piece pedestal dies, and the relatively-low cost die buttons used in the base, is fully covered in the literature. For your free copy, write Dept. MPM, Wales-Strippit, Inc., 247 S. Buell Rd., Akron, N. Y.

Handy pocket guide to steel analyses

This convenient, pocket-sized book has 20 pages of tables, listings, and notes covering the compositions of 40 stainless steels, 184 alloy steels, and 105 carbon steels — the steels most often used in industry.

The booklet also contains important Federal specifications with corresponding SAE, AISI, and AMS numbers. For your free copy, published by a leading steel producer, address Special Projects Editor, METAL PRODUCTS MANUFACTURING, York St. at Park Ave., Elmhurst, Ill.

Visible Control for Machine Systems

A colorful, 12-page manual entitled "Visible Control for Machine Systems" is now available. Concisely written and profusely illustrated, this manual explains how visible recordkeeping systems and housing equipment facilitate sound management decisions and, at the same time, get the work done faster by expediting machine operations. For your copy of the manual, KD 854, write Dept. MPM, Remington Rand, Div. of Sperry Rand Corp., 315 Fourth Ave., New York 10, N. Y.

Dust Collector Accessories

An information sheet covering data and information on dust collector accessories, including drawings, illustrations, and specifications, has been issued. The sheet lists an unusually-wide range of accessories for users of this manufacturer's cyclone separator and cabinet filter-type dust collectors, so that users can achieve practically "tailor-made" installations at minimum cost. For further information, contact Dept. KP-3, Torit Mfg. Co., Walnut and Exchange Streets, St. Paul, Minn.

Controls for Refrigeration and Air Conditioning

A recently-published six-page folder, outlining the newest controls for the air conditioning and refrigeration industries, contains brief data on hermetically sealed overheat protectors for single- and three-phase compressor motors, hermetically sealed thermostats for compressor motor winding use, and supplementary overloads for line current sensing. Included also is information on thermal-type and current-type compressor motor starting relays, a new series of commercial thermostats for operating and limit applications, and motor protector and motor starting relay kits for complete replacement service on domestic refrigeration. For your free copy of the folder, write Dept. MPM, Texas Instruments, Inc., Metals & Controls Div., Spencer Products Group, 34 Forest St., Attleboro, Mass.

Plug and Receptacle Catalog

A detailed catalog, complete with illustrations, schematics, technical information, and other pertinent data, plus detailed information on receptacles, plugs, and threaded inserts, is now available. These components are for use in switch gear, computers, instruments, telephone panels, airborne communications equipment, guidance systems, telemetering equipment, etc. For your copy of the new catalog, send your request for the Reli-Acon Brochure to Dept. MPM, Methode Mfg. Corp., 7447 W. Wilson Ave., Chicago 31, Ill.

Catalog on Laminated Plastics, Vulcanized Fibre

Basic application information and engineering data on laminated plastics and vulcanized fibre is given in a new condensed catalog just released. The eight-page, two-color catalog is provided to aid engineers in selecting and applying these basic materials for electrical, electronic, and mechanical components. General data give suggested applications, corresponding NEMA grades, military specifications, color and forms, and

sizes in which furnished. For your free copy of the catalog, write to Dept. MPM, Taylor Fibre Co., Norristown, Pa.

Barrel Finishing Media

A two-page catalog sheet on Media Classifier is available. The sheet describes three grades of media that can be re-sized automatically at rates of up to 6,000 pounds per hour. By loading a ten-cubic foot hopper, media can be re-sized and re-used again and again. Hoist pans under each screen collect sized media, and a large bin at the end of the classifier stores oversize media. For your copy of the Media Classifier, write for Bulletin on Model PCL-3 to Dept. MPM, Almco-Queen Products Div., King-Seeley Corp., Albert Lea, Minn.

Booklet on Lift Trucks

A 24-page booklet entitled "What Makes It Tick?" describes the features incorporated into this company's line of lift trucks. It deals with increased operating efficiency, greater driver comfort, and improved handling ease. For your copy of Booklet SP-10, write Dept. MPM, Towmotor Corp., 1226 E. 152nd St., Cleveland 10, Ohio.

Brochure Outlines General Plate Products

A revised brochure, "General Plate Products," 3rd edition, ten pages, describes the scope of the manufacturer's line including solid and clad base metals, solid and clad precious metals, thermostat metals, electrical contacts, and the firm's industrial metals: profile rolled strip, manganese age-hardening alloys, copper-cored glass sealing alloy wires, solid and clad reactor metals, etc. For your copy of the brochure, write Dept. MPM, Texas Instruments, Inc., Metals & Controls Div., 34 Forest St., Attleboro, Mass.

Permanent Pilot Light

A technical manual and catalog are offered. They describe pilot lights which are designed for up to 25,000 hours of operation. They are said to be ruggedly constructed to withstand rough duty service. They are also said to be easily attached to panels of any thickness by a vibration-proof speed nut combining permanent fool-proof mounting with production economy. Write Dept. MPM, Industrial Devices, Inc., Edgewater 13, N.J.

Motor and Circuit Protection

This catalog describes a line of protectors against motor burnout and dangerous circuit overload. It is said that they can be factory set for any time lag and easily mounted without harness. Ratings to suit every appliance. Write Dept. MPM, Mechanical Products, Inc., 1824 River St., Jackson, Mich.

V-Belt Pulleys

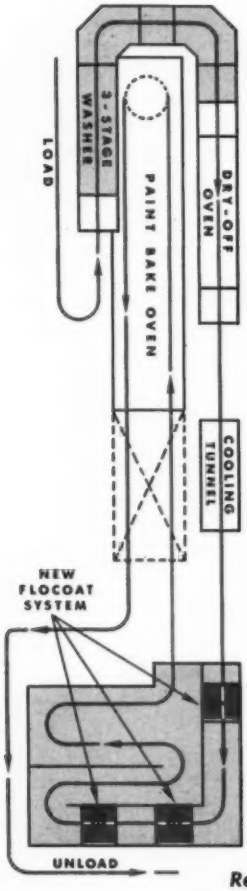
Complete specifications for a wide range of pitch diameters for both "A" and "B" section V-belts is provided in this catalog. The manufacturer states that, because of specialized equipment and tools for a wide range of sizes, manufacturers can cut tooling and production costs on standard sizes of pulleys by using these standard sizes. Write Dept. MPM, The Nagel-Chase Mfg. Co., 2817 N. Ashland Ave., Chicago 13, Ill.

Direct-On Porcelain Enameling

Technical literature is offered on a new citric-acid solution as a pickling bath which makes it possible to porcelain enamel direct-on. It is claimed that, with this new process, only cover coat enamel is required. The ground coat step is eliminated. No special handling technique or major installation of equipment is required. Write Dept. MPM, Chas. Pfizer & Co., Inc., Chemical Sales Div., 630 Flushing Ave., Brooklyn 6, N. Y.

Roll Formed Shapes

This bulletin provides complete information on roll formed shapes. Sections can be produced in: carbon, galvanized and stainless steel; aluminum; copper;



NEW 3 Color Flocoat System with 5 Minute Color Change

This system was specially engineered by Burdett Engineers to provide automation in multi-color paint applications in the plant of the Douglas-Fisher Corporation in Bellwood, Illinois, manufacturers of tubular metal furniture.

This complete finishing system by Burdett features a new concept in Flocoating with a 3-color system that provides color change in approximately five minutes.

This system consists of 750 feet of No. 348 conveyor, variable from 4 to 12 FPM; a 3-stage washer; a 25' dry-off oven heated by Burdett No. 10-L Burners, providing a heat range from 200° to 450° F.; a 15' cooling tunnel; a Burdett *3-color* Flocoating System; and a Burdett 2-Pass "A" Type "Radiant Heat" Paint Baking Oven with a range from 200° to 425° F. Operating at 325° F. on current production, the total baking cycle is approximately 8 minutes.

Here is a perfect example of the engineering skill and production "know-how" that Burdett offers you to open the door to improved quality of production — increased output — and lower cost of operating.

Whether you are considering a completely new finishing system—an addition to your present layout—or, the renovating of your old system—consult Burdett for the engineering answer with the bonus values—either "Radiant" or "Convection"

SEE OUR CATALOG IN SWEET'S PLANT ENGINEERING FILE OR WRITE FOR COPY

Request complete information without delay!

Write for the Burdett story!

BURDETT MANUFACTURING COMPANY

4918 South Monitor Avenue, Chicago 38, Illinois

DETROIT PHILADELPHIA NEW YORK CLEVELAND DALLAS

Manufacturers of

COMPLETE FINISHING SYSTEMS — "RADIANT-HEAT" SYSTEMS, OVENS, HEATERS, AIR MAKE-UP UNITS, SPRAY BOOTHS AND WASHERS

zinc; and clad metals. Tubing, shapes, channels and angles can be punched, notched, pierced, cut to length and delivered free of burrs to match your production schedule. Ask for bulletin 1017A, Dept. MPM, Roll Formed Products Co., 3758 Oakwood Ave., Youngstown, Ohio.

Spray Nozzles

Over 12,000 standard spray nozzles to fit your needs are described in this free catalog. For complete information, ask for catalog No. 24, Dept. MPM, Spraying Systems Co., 3202A Randolph St., Bellwood, Illinois.

Electrical Switches and Relays

"The biggest line of little switches," electrical switches and relays available from this company are described in an illustrated brochure. Switches described and pictured include miniature, subminiature, appliance, open blade, general purpose, metal clad, machine tool, and Acro-Lite. Several types of relays also are described. For your copy, write Dept. MPM, Acro Division, Robertshaw-Fulton Controls Co., P. O. Box 449, Columbus 16, Ohio.

Pre-Finished Metals Portfolio

This manufacturer offers a free portfolio giving you complete information on their pre-finished metals. It provides full details of interest to design, sales, and production supervisors. This material is said to be particularly adaptable to the appliance industry. Write Dept. MPM, American Nickeloid Co., Peru 11, Ill.

Automation in Finishing Systems

Bulletin No. 51 provides complete information on this company's 50 years of experience in serving industry. It provides details on the latest scientific applications of automation in finishing systems. For your copy, write Dept. MPM, Despatch Oven Co., 619 S.E. 8th St., Minneapolis, Minn.

Rack and Pinion Roll Feeds

A new 16-page catalog describes and illustrates rack and pinion roll feeds for OBI presses. Subjects covered are the operating and economical advantages of automated press operation, roll feed design, roll feed application, the respective function of various types of roll lifters, of feed rolls and the micro-running adjustment feature. Illustrations show feeds in operation position on various standard punch presses. A specification chart for use in roll feed selection is also included in this information book. For a free copy, write Dept. MPM, F. J. Littell Machine Co., 4143 N. Ravenswood Ave., Chicago 13, Ill.

Induction Heating

A new edition of the Lepel Induction Heating Review is available. It features a story on the floating zone method for growing germanium or silicon crystals; zone refining and zone leveling; and an article on coil design and construction. Write Dept. MPM, Lepel High Frequency Laboratories, Inc., Woodside, N. Y.

Self-Spraying Penetrating Oil

Using a special light oil formulated to free corroded parts fast, No. 203 penetrating oil is packed in self-spraying aerosol cans for pintpoint delivery and quick penetration. It is ideal for lubrication of tight-fitting parts and will not harm painted surfaces, according to the manufacturer. A free handbook, "Aerosols for Industry," is available from Dept. MPM, Industrial Supply Div., Sprayon Products, Inc., 2075 E. 65th St., Cleveland 3, Ohio.

Stress Relieving Welded Joints

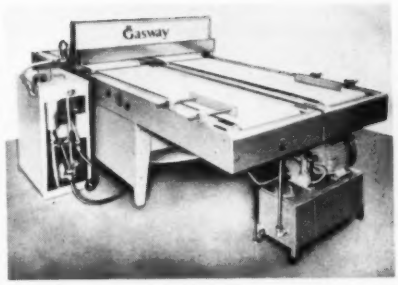
A new folder, which illustrates and describes the use of portable 400-cycle induction heating equipment for stress relieving welded joints, is being offered. The folder explains the principle of high frequency induction heating and answers many questions about its use for stress relieving welded joints. A number of unusual stress relieving jobs, which were accomplished with 400 cycle high frequency induction heating equipment, are also illustrated and described. Ask for DM-117, Dept. MPM, Hobart Brothers Co., Troy, Ohio.

High Speed Press Folder

A complete line of high speed power presses are fully detailed in a new folder. Featured in this folder is a press production chart designed to help the production engineer or plant manager quickly determine how high speed presses can increase production and efficiency. In addition, the entire line of 11 different types of presses is illustrated and outlined as a ready reference guide for the production executive. Ask for folder #HS-1. Write Dept. MPM, The Cleveland Punch & Shear Works Co., 3917 St. Clair Ave., Cleveland 14, Ohio.

Chemical Milling Brochure

Chemical Contour Corp. has announced its new Facilities brochure, describing the process of chemical milling and the company's operations. For a free copy, write Dept. MPM, Chemical Contour Corp., 16627 S. Avalon Blvd., Gardena, Calif.



Curtain-Type Coating Machine

A NEW CURTAIN-TYPE coating machine has been developed. This machine is based on the flow or pour-coating principle in which the work is passed through a continuous, falling curtain of coating material. This continuous curtain of paint, varnish, lacquer or other finish is deposited on the work to a thickness regulated by the flow rate of the curtain and the speed of travel of the work through the coater.

This new machine, called the "Electric-Kurtain Coater," will coat many different materials, including steel, aluminum fiberboard, paperboard, etc.

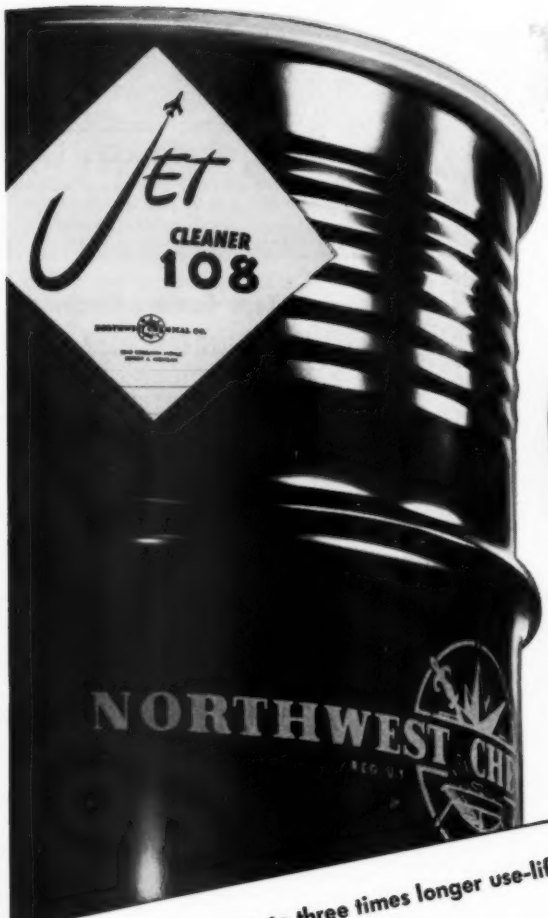
The machine incorporates a unique method of producing the falling point of paint. Instead of an orifice type of fountain, the machine is based on the principle of a weir or dam over which the material flows to produce the curtain. This principle permits a stream of coating material which is accurately controlled by variable flow rates. Coating thicknesses may be varied from ½ mil to 25 mils or more as desired.

According to the manufacturer, the curtain-type coater enjoys the advantage of being easily adjustable. It can be set up for operation with two adjustments only-one for conveyor speed through the machine and one for pump speed which regulates curtain speed. These adjustments are indicated by a conveyor speed tachometer and a pump pressure gauge.

Most coating materials, including paints, varnishes, lacquers, stains, sealers, etc., can be applied without requiring special formulation. Coating efficiency approaches 100 per cent because material is continuously recirculated from a reservoir. A solvent loss occurs due to slight evaporation in the curtain.

Each machine is equipped with a permanent, self-cleaning filter and incorporates an interchangeable and portable paint system which eliminates the need for color changeover operations. It is possible to change colors and finishes in a few minutes' time. The conveyor speed range is infinitely variable between 50 and 450 fpm.

Further information will be supplied by the manufacturer if you will write to Special Projects Editor, METAL PRODUCTS MANUFACTURING, York St. at Park Ave., Elmhurst, Ill.



ANNOUNCING JET 108

AN EXTREMELY LOW-FOAMING GENERAL USE SINGLE OR MULTIPLE STAGE SPRAY CLEANER FOR BETTER RESULTS AT LOWER COST!

- Gives up to three times longer use-life than competitive products.
- Better cleaning through unusually potent penetrants, surfactants and dispersing agents.
- Carries heavy dirt load without redeposition.
- Higher the concentration, lower the foaming.
- For use on all ferrous and non-ferrous metals except aluminum.
- Used at 100° to 140°F temperatures.
- Easily removes drawing compounds, oils, and greases.
- An effective rust-inhibitor for in-plant use.
- Ideal for use following soak cleaners.
- An easily handled, moist, granular alkali base material.
- Non-Toxic, dustless, non-caking.
- No disposal problem.

Got a problem? Let Northwest's Cleaning Specialists help you.

Licensed Manufacturers { Alert Supply Co., Los Angeles, California
Armalite Company, Ltd., Toronto, Canada

NORTHWEST CHEMICAL COMPANY

9310 ROSELAWN DETROIT 4, MICHIGAN

NEW

SUPPLIES & EQUIPMENT

W-Point Socket Set Screw

A fastener, so constructed that its cone point makes contact with the engaged work before the cup edge, which is also an integral part of the set screw, has been announced. The screw is said to provide 30 per cent more backout torque, and 50 per cent more resistance to

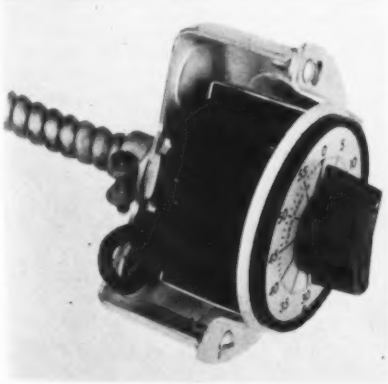
rotary slippage and vibration. It is claimed the W-Point socket set screw will track evenly, with a well-defined even groove, resulting in positive frictional contact of both flanks of the cup with the engaged work.

For further information, contact Dept. MPM, Parker-Kalon, Clifton, N. J.

Octagon Switch Box Adaptor Plate

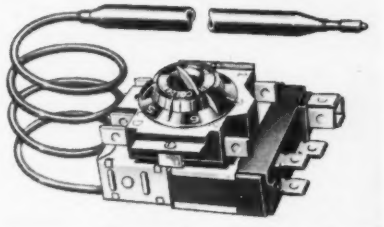
Adaptor plates are now available for mounting Mark-Time, 70,000 Series, panel-mounted time switches in four-inch octagon switch boxes. The plates are said to easily convert existing toggle switch operation to time switch operation for control of tumbling machines, plating equipment, mixers, fans, battery chargers, etc.

For further information, contact Dept. MPM, M. H. Rhodes, Inc., 30 Bartholomew Ave., Hartford 6, Conn.



Cycling Thermostats for Air Conditioning Equipment

A pair of cycling thermostat controls for air conditioning equipment are said to be easy to service, slim in design to permit shallow-depth mounting, and to have convenient side access to terminals. Designated the C21 and C22 Series, the controls are designed to operate window or

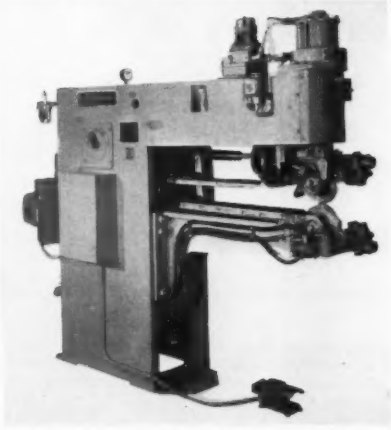


unit air conditioners, compressors, strip heaters, and reverse-cycle heat pumps under cross ambient conditions in a wide variety of applications.

For further information, contact Dept. MPM, Ranco, Inc., 601 W. Fifth Ave., Columbus 1, Ohio.

Standard Seam Welders

A line of standard seam welders, available in three sizes ranging from 50 to 400 kva inclusive, has been introduced. Each size is obtainable as a circular, longitudinal, or universal



machine, in a range of standard throat depths and transformers.

Some of the features are: one-piece trim-line frame, less floor space, greater working area, anti-friction slide readily adjusted for wear or takeup, lower arm and transformer design, higher performance, and maximum power efficiency.

For further information and Bulletin No. S-59, contact Dept. MPM, The Federal Machine and Welder Co., Warren, Ohio.

Ceramic Transducers

Development of a line of high temperature ceramic transducers, which are said to be capable of good performance up to 750° F., has been announced. A company spokesman has said that, as a result of the higher temperature operation, increased electrical outputs can be achieved and, in some cases, these transducers will reach higher output voltages per unit input pressure than can be reached with conventional ceramics. For further information, contact Dept. MPM, Gulton Industries, Inc., 212 Durham Ave., Metuchen, N.J.

Welding Exhaust System

A portable exhaust system, designed primarily to remove fumes from welding, soldering, and similar operations, has been announced. The unit is mounted on a rubber-wheeled truck, and the receptor exhaust inlet with magnet base holds to the piece being worked on, or on any convenient metal nearby. Receptor intake and flexible weldproof tubing dismantle and are stored on the truck.

For further information, contact Dept. MPM, Car-Mon Products, Inc., 1541 E. Devon Ave., Chicago 26, Ill.

High Speed Dry Abrasive Cutting Machine

A high speed dry abrasive cutting machine, styled Junior No. 2, has been introduced that is said to cut with a 1/32"-thickness cutting wheel, and to run cooler, minimize burn, and require little or no hand finishing. Hardened

steel may be cut at a rate of three to six seconds per square inch without changing Rockwell or psi readings. The machine cuts rounds up to 2¼ inches in diameter, and squares up to 1½ inch. Weighing 60 pounds, the unit is portable, and is powered by a ¾-hp, 3450 rpm motor.

For further information, contact Dept. MPM, Crabtree Mfg. Co., 903 N. Bagley St., Dallas 11, Texas.

Face-Tooth Clutches

A series of face-tooth clutches has been added to a line of stationary field electromagnetic clutches. Available in five ratings from 30 through 725 pound-feet of torque, the units are said to provide the highest torque in the smallest space of any commercially available stationary field clutch for such applications as machine tool feed and tracer and positioning drives. For further information, contact Dept. MPM, I-T-E Circuit Breaker Co., 1900 Hamilton St., Philadelphia 30, Pa.

Non-Fading Gold-Colored Aluminum Sheet

A gold-colored aluminum sheet, designated No. 80 Architectural Sheet, has been developed. Available as a standard product in a broad range of sizes and embossed finishes, the sheet differs from other gold-colored aluminum in that the source of the color is inherent in the alloy itself, and has not been achieved through

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Forecasts → *from Page 26*

Electric appliances to top '59 by 3 percent in '60

PRESSTIME REPORT FROM *Joseph F. Miller* • MANAGING DIRECTOR NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION

TOTAL INDUSTRY UNIT SALES of most major electric appliances broke all previous records in 1959, and member companies of the National Electrical Manufacturers Association are confident that even higher peaks will be reached next year.

As a group, major electric appliances in the scope of NEMA hit the highest shipment level since the record year of 1950 and showed a 17% gain over the 1958 mark. A further gain of 3% is forecast for 1960.

Individually, four of the major electric appliances — *built-in electric ranges, food waste disposers, dishwashers and food freezers* — topped all past industry sales records and also exceeded 1958 sales marks by from 9 to 38%. Shipments of built-in electric ranges this year reached 750,000 units for a gain of 38% this year over last. Food waste disposers registered a 27% gain with 785,000 units shipped; dishwashers, with 525,000 units shipped, showed a 24% gain, and food freezers, with 1,200,000 units shipped, registered a 9% gain.

Electric refrigerators and free-standing ranges topped 1958 industry sales marks by 20 and 15% respectively, with shipments of refrigerators reaching 3,750,000 and shipments of free-standing ranges hitting 930,000. The electric water heater was the only major electric appliance to show a drop in industry sales this year over last. Shipments in 1959 totaled 740,000 units, 10% below the 823,500 units shipped in 1958.

It is anticipated that all major electric appliances, with the exception of food freezers, will show increases in industry sales in 1960 over 1959. Shipments of freezers are expected to remain steady at 1,200,000 next year — the same mark as that reached in 1959.

Expect dishwashers to lead the pack

Three of the newer types of major electric appliances — dishwashers, built-in ranges and food waste disposers — are expected to register increases ranging from 5.1 to 9.5% next year over 1959.

It is anticipated that dishwashers will lead the 1960 purchasing parade with industry sales totaling 575,000 units for a 9.5% gain over 1959. Built-in ranges are expected to register a 6.7% gain in 1960 with a new shipment mark of 800,000 units, and food waste disposers will follow with an anticipated 1960 sales peak of 825,000 units for a gain of 5.1% next year over 1959.

Shipments of electric water heaters and refrigerators will probably increase in 1960 over 1959 by 1.4% and 1.3% respectively, while shipments of free-standing ranges may show a gain of 2.2%.

Shipments of electric water heaters are expected to total 750,000 next year; refrigerators, 3,800,000, and free-standing ranges, 950,000.

In addition to the optimistic over-all electric major appliance business outlook for next year, manufacturers also forecast a further closing of the gap in the ratio of sales between free-standing electric and gas ranges, with electric ranges continuing to gradually overtake the competition. In the built-in range market, electric ranges out-sell gas ranges by a ratio of 2 to 1.

NEMA MAJOR ELECTRICAL APPLIANCES
Total Industry Sales — Number of Units (Including Exports)

Major Electrical Appliances	Year 1958	Year 1959	% Change 59/58	Year 1960	% Change 60/59
Electric Household Refrigerators	3,116,700	3,750,000	+20.3	3,800,000	+1.3
Electric Farm and Home Freezers (includes chest and upright models)	1,100,900	1,200,000	+ 9.0	1,200,000	No Change
Electric Ranges (Over 2½ KW)					
Free-Standing Ranges	810,100	930,000	+14.8	950,000	+2.2
Built-In Ranges	544,400	750,000	+37.8	800,000	+6.7
Total Electric Ranges	1,354,500	1,680,000	+24.0	1,750,000	+4.2
Electric Storage Water Heaters	823,500	740,000	- 10.1	750,000	+1.4
Electric Dishwashers (Includes motor-driven types only. Excludes miniature or drainboard types.)	424,700	525,000	+23.6	575,000	+9.5
Electric Food Waste Disposers (Plumbed-in units only)	616,500	785,000	+27.3	825,000	+5.1

Source: NEMA Statistical Department

Forecast supplements

Admiral

expects appreciable increase in company sales in radio, TV, and appliances

by Ross D. Siragusa, President
Admiral Corporation

Television sales in 1960 will be spearheaded by the new wide angle 23-inch picture tube.

Our current television sales are about equally divided between the 23-inch and 21-inch sets. By the end of 1960, approximately 75 per cent of Admiral's television sales will be in 23-inch models which provide an almost rectangular picture . . .

We anticipate appreciable increases in the company's sale of television and radio receivers in 1960. In addition to the wide angle 23-inch tube, the political conventions and elections will be important stimuli to sales. Network and local coverage of these major news events has been commendable in the past and should be even better in 1960 . . .

We look for a substantial increase in commercial electronic sales and in the production of equipment for the armed forces in 1960. Admiral has invested heavily in expanding its research and engineering departments during the past two years to obtain more of this business.

Color television will continue to grow, and will expand more rapidly in the next two or three years than in the last six.

The appliance outlook also is bullish for next year. One reason is the vacuum caused by the long steel strike which seriously depleted inventories at all levels.

Admiral is in stronger condition today than at any time in the past four or five years, and we believe profits will increase in 1960 at a faster rate than

to Page 78 →

the use of dyes or other coloring agents. In the process, the color is "brought out" through anodizing under controlled conditions using standard anodizing equipment and techniques.

The product, said to be sunfast and to provide excellent color matching, is available in standard embossed patterns in flat or coiled sheet form, in widths up to 60 inches, depending on the embossed pattern, in thicknesses from .060 inch to .125 inch, and in tempers H-114, H-134, H-154, and H-174.

Technical advice on the use of the product and the anodizing process may be obtained by contacting Dept. MPM, Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.

Automatic Units for use with Welding Process

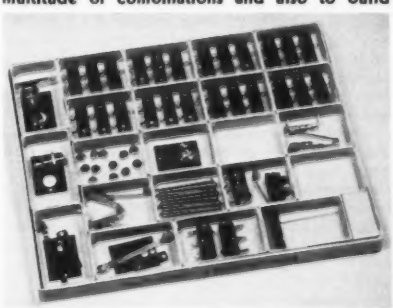
Two automatic units, designated Model HMH-D and HMH-E, have been placed on the market for use with the Heliweld (tungsten-inert-gas) welding process. These units are electronically controlled, and can be used for either ac or dc Heliwelding, without an ac-

cessory control, using argon, helium, or mixtures of these shielding gases as required. The units can be operated at a maximum of 500 amperes continuous-duty cycle, dc straight polarity using thoriated tungsten electrodes, or 350 amperes ac. Electrode diameters from .010" through 3/16" may be used. Holders have a maximum vertical rate of rise of 24" per minute.

For further information, contact Dept. MPM, Air Reduction Sales Co., division of Air Reduction Co., Inc., 150 E. 42nd St., New York 17, N. Y.

Designers Switch-Maker's Kit

A special switch-making kit is announced for use by designers in developing switch combinations for special applications. Containing the company's miniature snap action "TyniSwitches," the kit is said to be the first to be offered designers to aid them in their development problems. Thirty-two single pole, double throw "TyniSwitches" available in the kit provide a representative assortment of Class 2 and Class 4 switches which may be used to simulate a multitude of combinations and also to build



multipole switches. Switch models developed from the kit can be used as samples for production purchases. Eight varieties of actuator assemblies and 12 sets of assembly screws and nuts for stacking combinations of switches are included. All switches in the kit are 15 Amp., ½ hp, 125 and 250 V. ac, and are approved by the Underwriters' Laboratories. Your requests will be forwarded to the manufacturer promptly. Write Special Projects Editor, Metal Products Manufacturing, York St. at Park Ave., Elmhurst, Ill.

Housings for Power Mowers

This company is introducing a line of standard housings for power mower manufacturers. These housings are drawn seamless steel stampings, designed and produced on dies that are available for immediate production. The standard sizes will accommodate a variety of engines. For further information, write Dept. MPM, Stamping Division, Rockwell-Standard Corp., Utica 1, New York.

Suction solves stacking problem

Overhead suction mechanism as seen from below. Company engineers determined that aluminum strips will drop and stack as desired if there is no lateral motion of the strip at point of drop. Fins drop onto guide rods until correct number is obtained, after which a new set of guide rods is indexed into position.

ENGINEERS at the Westinghouse air conditioning plant at Staunton, Va. solved a ticklish problem in punching aluminum fins for fin- and tube-type heat exchangers. Previously, the fins were made from 13-mil thick material which was run through a punch press die in single strips, cut off to length, and gravity fed down a chute into a stacker where they were loosely aligned.

The problem arose when this material was replaced by 7-mil thick aluminum. The 7-mil fin was made by shearing multiple strips of material in the die; but since the thinner material lacked rigidity and weight, the former method did not work properly.

It was determined that the new aluminum strips would drop and stack as required if there was no lateral motion of the strip at the point of drop. Therefore, an overhead suction mechanism was adapted to the automatic punch press.

Now, after being ejected from the press, the 7-mil aluminum strips are caught overhead by suction from a vacuum-type box, held while the press feeds the desired length of fin, then dropped vertically as the vacuum is momentarily broken. The fins drop onto guide rods until the correct number is obtained. A new set of guide rods are then indexed into position and the machine automatically begins another cycle.

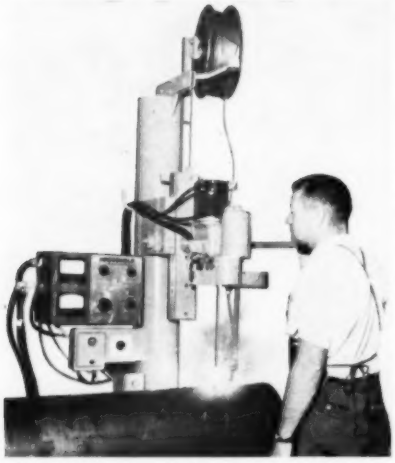
Modular Infra-red Heating Ovens

Modular infra-red ovens that can be made to fit any drying system, that are said to give uniform heat over entire emitting area, and that can be used with any conveyor have been announced. The basic module of these ovens is called RediRay, a completely self-contained heater which uses a ceramic face as a source of infra-red radiation. The ceramic face is brought up to emission temperature by the formed resistance wire embedded in an insulating block back of it. The entire heating block is backed up by alternate layers of batt and reflective insulation. All are mounted in a sheet metal shell of modular dimensions. Another feature of the oven allows radiant energy which does not strike the work to be absorbed by the module directly opposite and thereby reduce the power necessary to maintain proper radiation temperature. This regenerative principle has resulted in high efficiency. For further information, write

Dept. MPM, Infra-Red Systems, Inc., 240 Route 23, Riverdale, N. J.

New High Speed Spud Welder

This welder is designed to weld blank or threaded spuds to water tank head or tank sides, in approximately one-half the time usually required. A complete circle weld can be accomplished on a ¾-inch spud in four seconds.



Spud locater arm and welding head positions spud for welding. Push-button control, in handle of the locater arm, activates the fixture, which welds and stops automatically.

The use of the intershield process eliminates the need of separate flux feed units, collector rigs, and other accessories.

Tank conveyor accommodates tanks ranging in size from 12 inches to 20 inches in diameter.

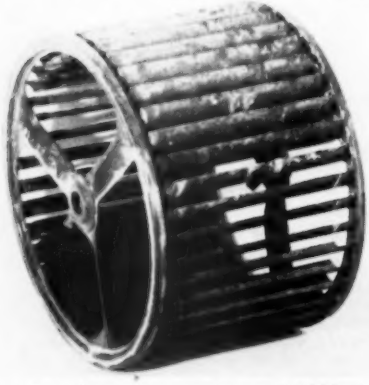
For additional information, contact Dept. MPM, Leonard Precision Products Co., 9200 Bolsa Ave., Santa Ana, Calif.

Blower Wheels

A new line of "porcelainized" enamel blower wheels and assemblies that exhibit exceptional resistance to corrosion has been developed.

The "glass-coated" wheels are designed for process equipment, air conditioning equipment, cooling towers, evaporative condensers, air washers, and other applications where corrosion or abrasion may be present.

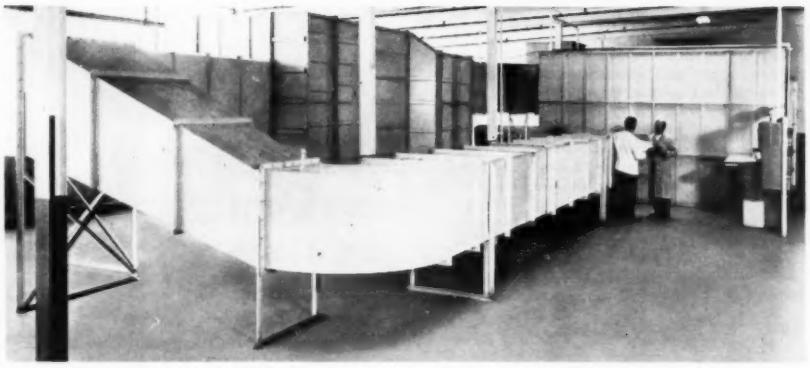
Wheels are available in ten-inch through



twenty-inch sizes, in capacities to 12,000 cfm. Corresponding "porcelainized" housings and bearing brackets can also be supplied.

Of lightweight construction, the wheels maintain the same run-out and dynamic balance tolerances as standard wheels.

Complete data can be obtained through Special Projects Editor, METAL PRODUCTS MANUFACTURING, York St. at Park Ave., Elmhurst, Ill.



(Above) — New 35,000 cfm code tester for blowers is in operation at The Lau Blower Co., Dayton, Ohio. This test tunnel is believed to be the largest ever installed by a manufacturer for sole testing of blowers. Control panel is located at extreme right. Behind this is large chamber where blower undergoing test is mounted. (Right)—M. S. Steeley, supervisor, Lau engineering laboratories, and Robert McGonigle operate controls from central panel.

35,000 cfm tunnel for blower testing

TEST FACILITIES at the Lau Blower Co., Dayton, Ohio, have been greatly expanded with the completion of a 35,000 cfm code tester. It is the largest of its type ever installed by this blower and fan manufacturer, and represents an increase of 12,400 cfm over the previous largest tunnel, the report states.

The new tunnel is divided into five sections: (1) test chamber where the blower under test is positioned and powered by a 15-hp dynamometer or other adequate power source; (2) test blower discharge duct; (3) approach chamber; (4) nozzle chamber with nozzle manifold; and (5) supply blower chamber.

The supply blower section has a 36-inch, backward inclined, double inlet blower with controllable inlet valves, plus two outlets and three dampers in the exhaust duct.

All readings are made on a central control panel. This panel holds controls and instruments for the dynamometer, test blower, supply blower, and variable suction inlets. "This arrangement provides more direct readings with fewer calculations," says William H. Wentling, chief engineer for Lau Blower.

Data on the blower performance is to be made available to manufacturers of heating and air conditioning equipment, as well as to other users of similar blower equipment.

New Aluminum Alloys For Water Heaters

Aluminum Co. of America has announced the commercial availability of a new group of sheet and plate alloys said to be outstandingly superior to previously-available aluminum alloys in resisting corrosive perforation by hot water.

The new alloys were developed during a ten-year Alcoa research program conducted in cooperation with two leading water heater manufacturers, the report states.

Trade and customer acceptance of water heaters equipped with the new aluminum tanks is expected to be most enthusiastic where 180° F. water is required for the efficient operation of modern automatic washing machines and dish washers.

The new aluminum alloys are an advanced form of the first "alclad" alloys developed more than thirty years ago. They combine two or more specially designed alloys in a single fabricated form.

For further information about the new alclad alloys, write Dept. MPM, Aluminum Co. of America, 798 Alcoa Bldg., Pittsburgh 19, Pa.

Fume and Mist Suppressant

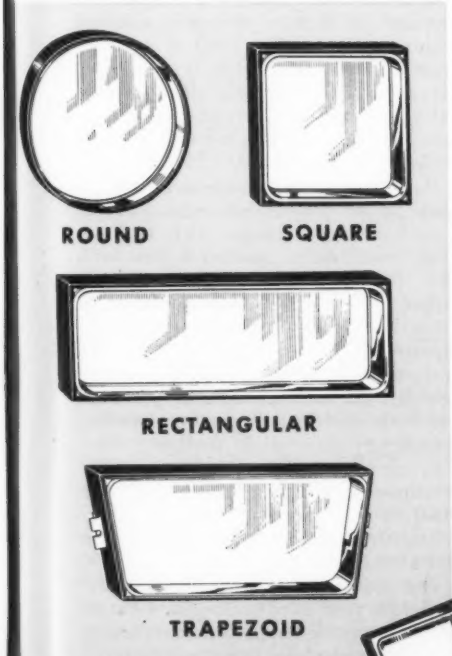
A new fume and mist suppressant for use in chrome plating, anodizing, bright dipping and other metal finishing processes where gas generation is a problem has been developed. Designated as ARP #21 Mistex, this liquid material acts to form a thin foam blanket on the surface of the process solution. This blanket reduces fuming by trapping gas bubbles as they rise from the solution and absorbing both the gas and the vapor in the bubbles. It also reduces solution loss from mist or spray and, further, reduces drag-out as work is removed from the bath. Heat savings are also realized by the reduced need for ventilation. The compound is formulated to provide the foaming action without interfering with either the action or the balance of the bath on which it is used. For further information and samples, write Dept. MPM, Allied Research Products, Inc., 4004 E. Monument St., Baltimore 5, Maryland.

A. BELANGER . . . another user of PERMA-VIEW® WINDOWS

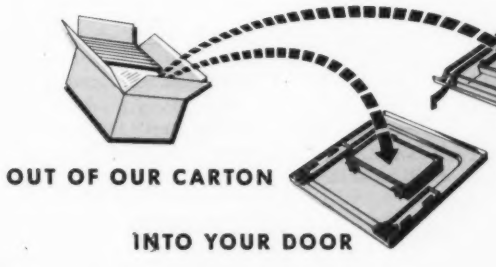
A great majority of the leading manufacturers of ranges (both free-standing and built-in) now use PERMA-VIEW windows to enhance the appearance and convenience and economy of their products. During the past few years the demand for "visible baking" has contined to grow. This "No-Fog" window is the best and most economical answer to this demand.

The PERMA-VIEW window is pre-engineered and comes to you ready for immediate installation in your range, "out of our carton into your door." It is mechanically sealed to prevent infiltration of vapors and to eliminate "fogging." Let our specialized production lines serve as a part of your sub-assembly facilities. If you do not use a window, if you make your own window, or if you buy your window from another source, we suggest you phone or write us for complete details on the ease and economy of adding this proven sales feature to your new ranges.

A. BELANGER, LTD.
one of the
83 leading range manufacturers
using
PERMA-VIEW oven-door windows



We can manufacture any shape, any size, any thickness to meet your engineering requirements. Alternate methods of attachment may be used.



GENUINE PERMA-VIEW NON-FOG

MILLS PRODUCTS INCORPORATED

1015 WEST MAPLE ROAD • WALLED LAKE, MICHIGAN

→ *from Page 74*

sales. Inventories are at their lowest point in years, and our entire factory, distributor and dealer sales organization are geared for a healthy 1960 operation.

Waste King

sales $50 million for 1961

by Bertram Given, President, Waste King Corporation

Waste King Corp. has set its 1961 sales goal at $50 million.

Substantiating the company's 1961 sales goal is the low market saturation of garbage disposers and dishwashers. It is estimated that only 9.7 per cent of the electrified homes today have disposers and 6.7 per cent dishwashers. Waste King has proven its strength in the disposer market and has a growing position of importance in the dishwasher field. Another factor is the rise in sales of Cribben and Sexton Co., Chicago, since its acquisition as a Waste King subsidiary early in 1959.

Our forecast shows a 42½ per cent increase in industry sales of automatic dishwashers and a 25 per cent rise for garbage disposers *(1960 over 1959)*.

The percentage gains cited above will result in the sale during 1960 of 764,000 dishwashers with a retail value of $164,260,000; 949,000 disposers valued at $71,145,000; 460,000 built-in gas ovens and ranges at $126,500,000; 854,000 electric built-in ovens and ranges totaling $213,500,000; and 1,793,000 free-standing gas ranges valued at $331,705,000.

Wendell C. Davis, president of Cribben and Sexton Co., predicts a strong increase for sales of built-in ovens and ranges — 28 per cent in the gas field and 22 per cent for electric. Free-standing gas range sales will rise 4 per cent in 1960.

Frigidaire

slight increase in most product lines

by Herman F. Lehman, Vice President, General Motors Corporation, General Manager, Frigidaire Division

Frigidaire production has not been affected by the steel strike, and our employment, which exceeds 16,000, rose slightly during the year. It looks as though 1959 will prove to have been our second biggest year in history, exceeded only by 1955.

Forecast for 1960

Looking ahead conservatively, we expect 1960 appliance industry sales to continue at about the same high 1959 level, with perhaps slight increases in most product lines, particularly in *food freezers, dryers,* and *dishwashers.*

Whirlpool

shipments to be up 16 per cent

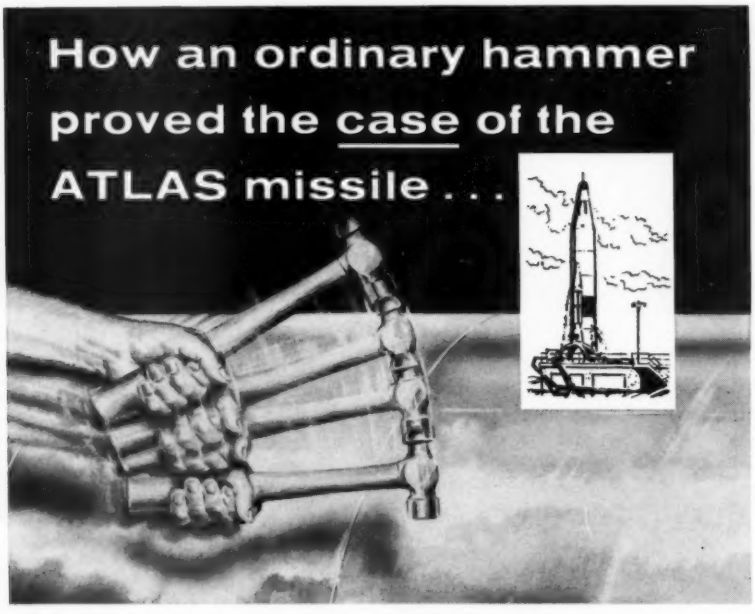
by Robert W. Armstrong, General Manager of Public Relations, Whirlpool Corporation

Whirlpool Corporation anticipates an increase in factory domestic sales of major appliances for 1960 of approximately 1.5 per cent. While it is expected that growth products will make substantial gains, certain other, high-saturation items will make no increases or even fall behind.

Biggest estimated increases will be made by air conditioners with 15.4 per cent, built-in gas ranges with 14.3 per cent, combination washer-dryers with 12.5 per cent, and built-in electric ranges with 7.1 per cent. On the other hand, automatic washer shipments are expected to stay at the 2.9 million level projected for 1959, wringer washers may fall off as much as 10.7 per cent, and both electric and gas free-standing ranges may show slight declines.

In contrast to the industry picture, Whirlpool Corporation is in a growth situation and *expects its own factory shipments to rise approximately 16 per cent over 1959.*

The industry's biggest danger heading into a year as promising as 1960 remains the strong temptations to crank up production schedules to unrealistic levels in the hope of capturing larger shares of



The body of the missile, essentially one big fuel tank, is similar in principle to an inflated football. Convair-Astronautics broke new ground in missile design by developing a super-strong structure with a comparatively thin stainless steel skin to keep weight to a minimum. This stainless steel skin is so thin that the interior has to be pressurized to preserve the shape of the body as propellants are consumed in flight, or when the missile is being transported on the ground.

Some critics, however, thought the body was too fragile—"You could dent it with a hammer." So, recently, when the Scientific Advisory Board, engaged in a re-evaluation of all missile programs, arrived at Convair-Astronautics to take a reading on the ATLAS, they found that Convair had thoughtfully placed a number of hammers within easy reach of a finished missile. "Go ahead, bash it," invited Convair. The SAB members swung lustily. *Not a dent was registered,* for, although the walls are thin, the stainless has a minimum tensile strength of 200,000 psi.

This stainless steel skin material, supplied by Washington Steel, required extremely close control of mechanical properties and gauge tolerance which are regularly produced through Washington Steel's long experience with precision rolling equipment.

Stainless Steel—the Space Age Metal

Washington Steel Corporation

1-G Woodland Avenue
Washington, Pa.

the market. This has been the largest single contributor to depressed pricing and fluctuating employment levels in the appliance industry during the post-war period. Intelligent market forecasting and planning are vital elements in averting such disorder.

Kelvinator

the beginning of an important period

by B. A. Chapman
Executive Vice-President and General Manager, Kelvinator Division
American Motors Corporation

The year 1960 is the beginning of an important period for the appliance industry. The pre-World War II refrigerators, ranges and wringer washers will have reached their optimum retirement age, providing a big replacement market. In addition, many of the newer appliances, such as automatic washers, automatically defrosting refrigerators, dryers and home freezers that were bought immediately after World War II will be replaced because of the many improvements in current products over those purchased in the early post-war period.

One trend that has been evidenced among consumers is the desire for a general improvement in product quality and more emphasis on the benefits derived from the product, rather than how low the price can be made before purchase.

The appliance industry has had some relatively poor periods in its history, as well as some great years. The year 1960 should be a good year and the gateway to a period of record production and sales.

Norge

nearly ten per cent industry gain predicted

by Judson S. Sayre, President,
Norge Division, Borg-Warner Corporation

In 1960 the major home appliance industry will record a total gain nearly 10 per cent ahead of 1959. This mark will be achieved even though 1959 will probably finish as far as 20 per cent ahead of 1958.

But the stage is set for an explosive increase in the years immediately ahead. I am convinced that one of the next five years — probably 1962 or 1963 — will set an all-time industry high.

All the ingredients point to this probability, including rapid household and population growth and a strong replacement period. Yet what very well may be the most potent of these is the ever-growing willingness of the consumer to buy more and better labor-saving home appliances.

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METAL PRODUCTS STATISTICS

		1959 (Units)	1958 (Units)	% Change
Gas Fired Furnaces	October	130,900	107,100	+22.2
	Jan.-Oct.	904,600	702,700	+28.7
Gas Fired Boilers	October	18,500	18,300	+ 1.1
	Jan.-Oct.	118,600	105,900	+12.0
Gas Conversion Burners	October	26,300	20,600	+27.7
	Jan.-Oct.	135,600	125,700	+ 7.9
Oil Fired Central Heating Equipment	Sept.	66,868	68,046	- 1.7
	Jan.-Sept.	438,334	393,181	+11.5
Gas Ranges, Free Standing	October	157,100	185,600	-15.4
	Jan.-Oct.	1,408,300	1,360,000	+ 3.6
Gas Ranges, Built-In	October	33,100	26,300	+25.9
	Jan.-Oct.	287,700	184,000	+56.4
Gas Water Heaters	October	273,500	265,900	+ 2.9
	Jan.-Oct.	2,560,600	2,269,000	+12.9
Gas Vented Recessed Wall Heaters	October	53,500	57,100	- 6.3
	Jan.-Oct.	372,500	315,600	+18.0
Gas Floor Furnaces	October	16,500	18,400	-10.3
	Jan.-Oct.	86,100	84,500	+ 1.9
Gas Direct Heating Eqpt.	October	222,200	243,000	- 8.6
	Jan.-Oct.	1,222,600	1,164,000	+ 5.0
Gas Unit Heaters & Duct Furnaces	October	20,900	16,300	+28.2
	Jan.-Oct.	127,300	105,900	+20.2
Gas Incinerators	October	5,400	4,500	+20.0
	Jan.-Oct.	38,300	40,700	- 5.9
Electric Household Refrigerators	October	329,600	277,500	+18.7
	Jan.-Oct.	3,236,500	2,584,300	+25.2
Electric Farm & Home Freezers	October	89,600	110,000	-18.5
	Jan.-Oct.	1,077,300	945,900	+13.8
Electric Ranges, Free Standing	October	74,200	78,200	- 5.1
	Jan.-Oct.	781,500	652,100	+19.8
Electric Ranges, Built-In	October	69,200	57,300	+20.7
	Jan.-Oct.	613,800	429,100	+42.8
Electric Storage Water Heaters	October	61,200	76,400	-19.8
	Jan.-Oct.	687,200	688,200	- 0.1
Electric Dishwashers	October	53,500	38,800	+37.8
	Jan.-Oct.	449,500	327,200	+37.3
Electric Food Waste Disposers	October	80,500	53,800	+49.6
	Jan.-Oct.	634,300	489,300	+29.6
Combination Washer-Dryers	October	24,798	22,843	+ 9.0
	Jan.-Oct.	165,352	128,988	+28.0
Washers, Automatic & Semi	October	282,415	303,102	- 7.0
	Jan.-Oct.	2,475,487	2,253,654	+10.0
Washers, Wringer & All Other	October	91,720	100,954	- 9.0
	Jan.-Oct.	780,857	755,140	+ 3.0
Electric Dryers	October	110,834	115,133	- 4.0
	Jan.-Oct.	719,877	623,824	+15.0
Gas Dryers	October	68,835	65,272	+ 5.0
	Jan.-Oct.	370,218	287,205	+29.0
Vacuum Cleaners	October	330,899	339,127	- 2.4
	Jan.-Oct.	2,836,882	2,684,473	+ 5.7
Metal Furniture	October	*	*	+ 5.0
	Jan.-Oct.	*	*	+ 5.0
†Television	October	706,583	495,617	+42.5
	Jan.-Oct.	5,195,440	4,067,606	+27.7
†Radio (1)	October	1,795,718	1,218,575	+47.3
	Jan.-Oct.	12,722,970	8,904,772	+42.8
Compressor Bodies (2)	June	497,692	333,642	+49.1
	Jan.-June	3,080,560	2,139,885	+44.0
Steel Barrels & Drums	September	2,383,519	2,990,577	-20.3
	Jan.-Sept.	26,166,016	23,657,842	+10.6
Steel Pails	September	6,827,105	7,654,916	-11.0
	Jan.-Sept.	63,083,862	55,881,133	+12.0
Typewriters	October	122,089	*	*
	Jan.-Oct.	1,024,314	*	*
Unitary Air-Conditioners (3)	Jan.-Sept.	234,444	*	+47.0
Heat Pumps	Jan.-Sept.	25,834	*	+108.0

(1) Including auto receivers (2) Except for household refrigerators
(3) Including heat pumps * Not reported
† Output — all other figures are factory shipments or factory sales

Sources for this information: Gas Appliance Manufacturers Association, National Electrical Manufacturers Association, American Home Laundry Manufacturers Association, Vacuum Cleaner Manufacturers Association, National Association of Furniture Manufacturers, Electronic Industries Association, Air-Conditioning and Refrigeration Institute, and U.S. Dept. of Commerce.

COMING FEATURES

DESIGN

WHAT TO LOOK FOR IN FUTURE APPLIANCE DESIGN

DESIGNING A COMPLETELY NEW GAS REFRIGERATOR

FABRICATION

FABRICATION OF THE ALUMINUM ALLOYS (PART II)

AUTOMATED FABRICATION AT HOTPOINT

SPEED FORMING PRE-PLATED LAWN MOWER HANDLES

FABRICATING AT AVONCRAFT DIV., AVONDALE MARINE WAYS, INC.

COST CONTROL FOR A CONTRACT STAMPING PLANT

FINISHING

PORCELAIN ENAMELING AT AVONCRAFT DIVISION

ENAMELING FURNACE HAS WIRE MESH BELT

MODERNIZED FINISHING AND ASSEMBLY FACILITIES AT ARMSTRONG

FINISHING WATER HEATER PARTS AT HOTSTREAM

GENERAL

ORGANIZED APPLIANCE SERVICE

SPECIAL SECTION — THE COMPLETE BUSINESS, ENGINEERING AND PRODUCTION STORY OF ONE OF THE COUNTRY'S LEADING MULTI-PRODUCT APPLIANCE MANUFACTURERS

"RELIABILITY" — THE FUTURE WORD FOR PRODUCT DESIGNERS

SPRAYABLE URETHANE FOAMS

WATER HEATER MANUFACTURING AT HOTSTREAM

VOLUME PRODUCTION OF PORTABLE ROOM HEATERS

THE USE OF PLASTISOLS AT WASTE KING

AN EXCLUSIVE INTERVIEW FEATURE ON CURTAIN WALL CONSTRUCTION

SPECIAL SECTION (MAY) — THIRD ANNUAL SECTION DEVOTED TO AUTOMATIC MERCHANDISING INDUSTRY (COIN-OPERATED MACHINES)

NEWS

MONTHLY STATISTICAL REVIEW

STAFF EDITORIAL AND PHOTO COVERAGE OF ALL IMPORTANT INDUSTRY MEETINGS

1960 will bring increases all up and down the major appliance ("white goods") line. Clothes dryers and automatic washers will jump as much as eight percent from big 1959 years of 1,400,000 and 3 million units, respectively. Refrigerators have an excellent opportunity to show more than a ten per cent gain from 3,650,000 units.

We confidently expect that next year consumers will spend nearly $1.5 billion for laundry equipment alone, and spending for refrigerators will cross the $1 billion mark.

Hotpoint

forecast in brief

by John F. McDaniel,
General Sales Manager,
Hotpoint Division,
General Electric Company

Preliminary studies of our new Ten Year Forecast indicate the appliance industry will maintain approximately a 7-per cent growth per year every year for the next ten years.

Other preliminary figures indicate retail sales of major appliances in the next ten years will have values in excess of $40 billion. Other preliminary estimates indicate that the major appliance industry will ship in 1959, 3,550,000 refrigerators; in ten years that figure will rise to 5,400,000 units. The American consumers are now buying at the annual rate of 14 million appliances per year; ten years hence the rate will rise to 19,400,000. Our forecast also indicates per-year rate of electric ranges will be 1,100,000, and automatic clothes washers 3,300,000.

Westinghouse

Major appliance outlook for 1960

by John W. Craig, Vice President,
Westinghouse Electric Corporation,
General Manager, Electric Appliance Divisions

Full impact of the steel strike, still imponderable for 1959, also beclouds the 1960 picture. Particularly this is true of the first quarter picture.

The 1960 total major appliance volume should be about five per cent above 1959. This statement assumes that final figures for all of 1959 show the same growth trends of the first ten months. Worded differently, 1960 will be perhaps five per cent better than 1959 would have been without a steel strike.

The most sizable gains will show up in growth appliances like dishwashers, disposers and room air conditioners.

Refrigerators remain top dollar

Refrigerators remain the most important single major appliance product. Consistently they represent from one-fourth to one-third of major appliance

to Page 86 →

What has Kerns' Drawing Compound got to do with . . .

. . . ask Temco

In the Temco fabricating department literally **hundreds** of different die sets . . . including those for stamping out discs for "Coca-Cola" signs . . . are in use regularly. There are five "big" presses, shown below, ranging from 400-ton down to 75-ton capacity and numerous small presses in constant operation at Temco. Versatility is the first requirement for equipment and a **most reliable drawing compound** is a necessity. That's why Temco has been a regular user of **Kerns' "Dry-Film"® Drawing Compound** for many years.

ONLY KERNS OFFERS SO MUCH!

ECONOMY—cost per stamping is reduced because only 1 pound of "Dry-Film"® compound is required where 5 pounds of conventional wet type compound would be required.

DRAWABILITY—permits severe draws. In many cases deep draw quality stock can be replaced by commercial quality stock.

RUST PREVENTION—excellent rust protection both before and *after* drawing.

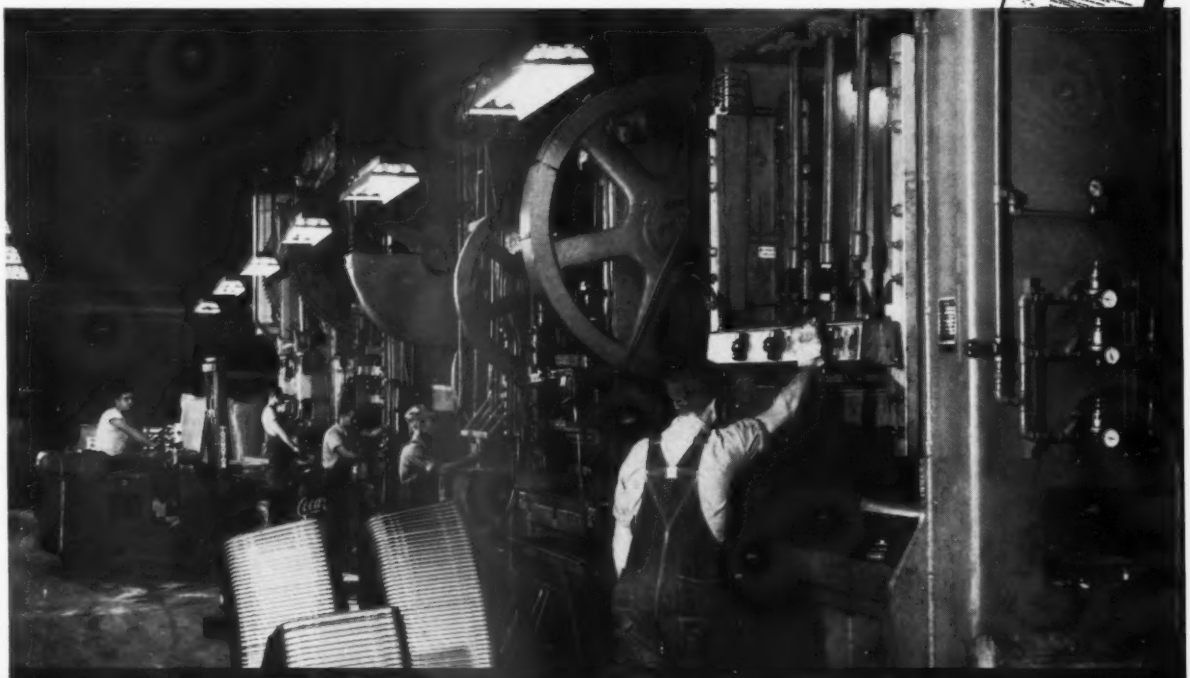
CLEANABILITY—coated parts will clean with utmost ease even after extended periods of storage. No need to clean before welding.

COMPLETE SOLUBILITY—once dissolved (being a true solution) will not separate or settle out.

WIDE CHOICE OF APPLICATION METHODS—can be applied manually or with automatic equipment by spray, roller coater, flow coater or dip tank.

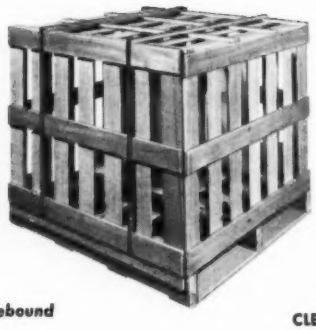
Try it . . . prove it to yourself by using Kerns'
MEMO BILLING TRIAL BASIS.
Kerns will supply material for production test . . . no formal invoice rendered unless completely approved in production.

Write for Technical Data Sheet "Dry-Film"®



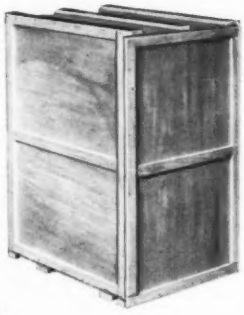
L.R. Kerns Company
2659 EAST 95th STREET • CHICAGO 17, ILLINOIS

Subsidiary Plant • KERNS PACIFIC CORPORATION, 630 N. BATAVIA STREET • ORANGE, CALIFORNIA



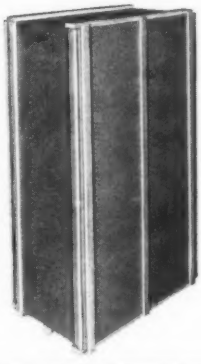
PALLET BOXES — *Hinged Corner*

PALLET BOXES — *Wirebound*

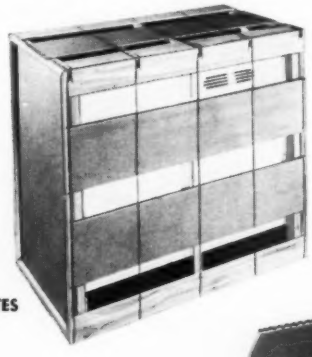


CLEATED BOXES

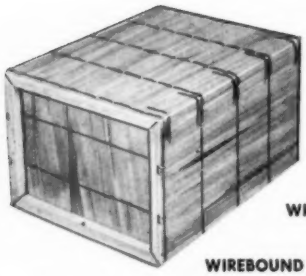
We make 'em all



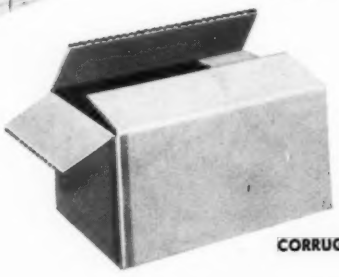
E-Z PAK CLEATED CORRUGATED
(Watkins Type)



WIREBOUND CRATES



WIREBOUND BOXES



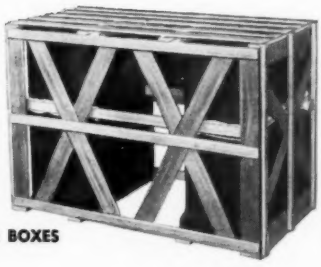
CORRUGATED

you can be sure . . . .

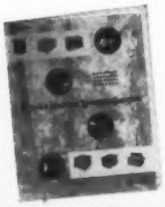
that recommendations from Chicago Mill are based on impartial, unbiased decisions because we manufacture the most diversified line of shipping containers in the country!

Materials used include—

Plywood • Craveneer • Corrugated • Veneer • Resawed



HINGED CORNER CRATES OR BOXES



FREE! *Illustrated catalog showing the various types and applications of Chicago Mill containers, Chicago Mill's services.*

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- ROCKMART, GEORGIA
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safe transit

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editorial voice of the national safe transit program

devoted to improving packaging methods and shipping and materials handling methods for the appliance and metal products manufacturing industries. This section contains plant experience information and industry advances for the use of all executives and plant men interested in improving packaging and shipping methods and in loss prevention. The section contains complete information on the national safe transit pre-shipment testing program for packaged finished products and detailed reports of divisions and sub-committees of the National Safe Transit Committee.

Canada Packagers To Spend $642 Million In 1960—Jamison

L. G. Jamison, general manager of the Packaging Assn. of Canada, has stated that Canadian industry will spend more than $642 million on packaging equipment, materials, and services in 1960. He added that this represents a seven-per cent increase over 1959 spending, and results from the need for better and faster packaging techniques brought about by newer merchandising methods.

Yale Gets Underwriters' Approval

Yale Materials Handling Div. has been granted the Underwriters' Laboratories approval on propane-powered models in their G-52 and KG-51 lines of trucks. This will serve to broaden the application of LP-gas powered industrial lift trucks into specified hazardous locations.

Guide To Military Packaging

A textbook which spells out military procedures for packaging, and is used to train students in the joint Military Packaging Course, has been published for sale to the public by the Office of Technical Services, U.S. Dept. of Commerce, Washington 25, D.C. The textbook appears in two volumes, one dealing with preservation and protection, and the other with packing and carloading. Prices are $6 and $5 respectively.

Lamson Offers Mast and Carriage of Aluminum

Aluminum's combination of strength and light weight is utilized in the Model B-224 lift truck manufactured by Lamson Mobilift Corp., Portland, Ore. The unit employs an aluminum mast and carriage, said to be the first ever offered on any lift truck, and which weighs a third as much as those constructed of other materials. The mast, with a collapsed height of 68 inches, is the first Mobilift mast ever offered in keyed-and-bolted, rather than welded, design. Special rollers are used between mast sections to carry side-thrust pressure. Maximum fork height is 137 inches.

William R. Warner, advertising manager of Lamson Mobilift, said the model will undergo exhaustive tests before being placed in production as a standard item. Technical assistance in aluminum applications was provided by Reynolds Aluminum Supply Co.

The Model B-224 lift truck is said to be the first to offer a triple mast and carriage of aluminum, of keyed-and-bolted design, with side-thrust pressure rollers. Use of aluminum is expected to produce savings in deadweight and maintenance.

Strapping Machine Catalog

A 16-page, pocket-size illustrated catalog entitled, "Strapping Machines For Automatic Packaging," describes numerous models of automatic packaging machines using both steel strapping and wire. It also describes several hand tools for strapping of packages and bundles which are too few to warrant the use of automatic machines. The catalog is free upon request to Dept. MPM, General Strapping Corp., 100 Park Ave., New York 17, N.Y.

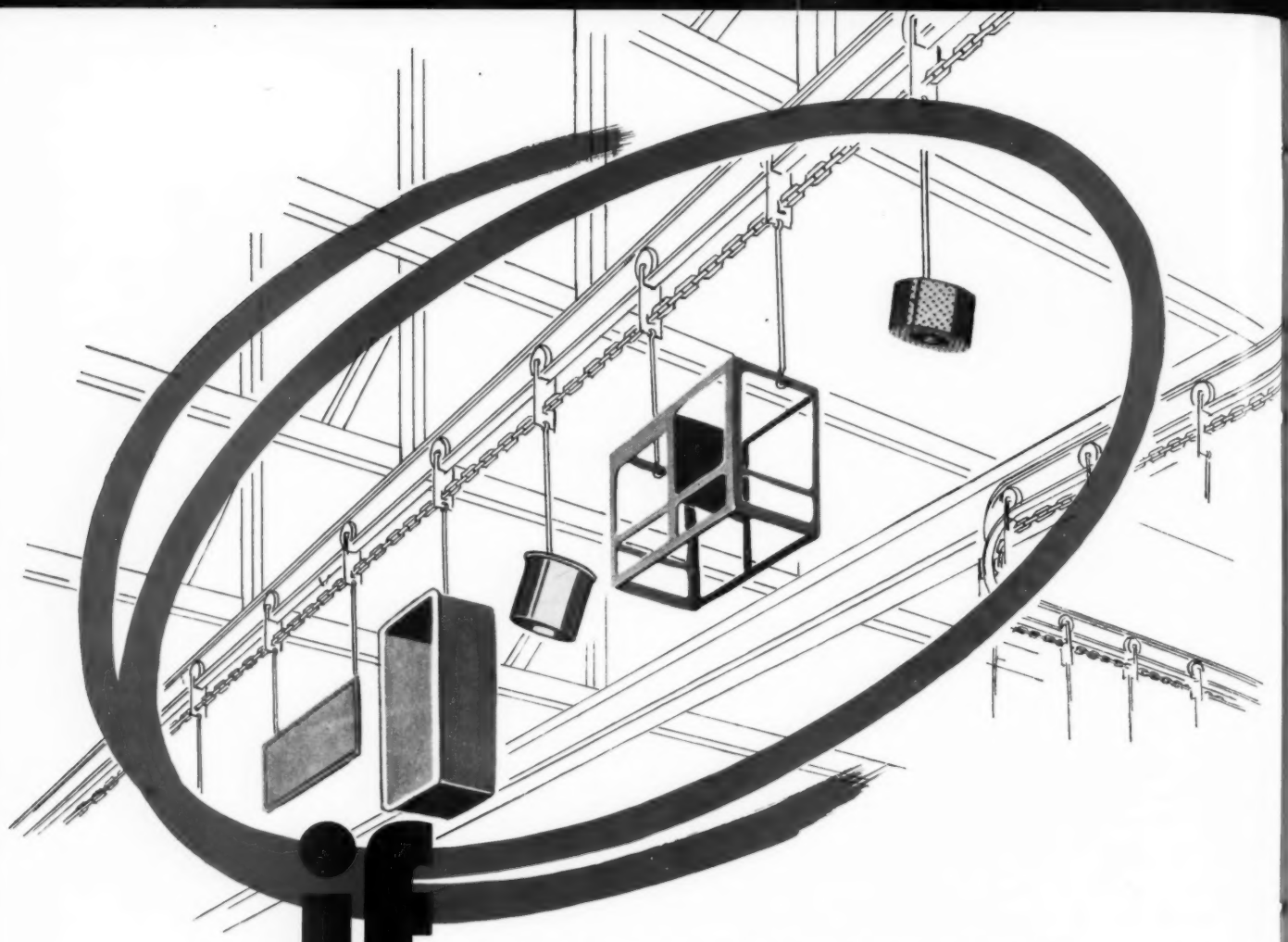
New England Material Handling Show Set For June 6-8

Approximately 65 per cent of the available floor space in Commonwealth Armory, Boston, has been requested by manufacturers for the Material Handling Institute's New England Show, June 6-8. According to L. West Shea, managing director of the Institute, this prompt response to the Sept. 11 invitations to exhibit is a positive indication of the industrial marketing interest in New England.

Polyethylene Buffer Solves Packaging Problem

New Hampshire Ball Bearings, Inc., Peterborough, N.H., has developed a new way to ship its miniature and instrument bearings without their being damaged. A polyethylene buffer is the solution.

Different quantities and sizes of bearings are shipped in any one of six standard plastic vials. The remaining air space is filled with the polyethelene buffers, so that bearings are tightly pressed against each other. By eliminating the chance to jiggle, damage in transit is prevented.



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LOW FIRING GROUND COATS

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it will pay you to investigate all their advantages without delay. Your Chicago Vit sales or service representative will arrange a demonstration with results that will convince you they're all our customers say—and more!

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serving the needs of the porcelain enamel industry since 1918

THE finish LINE

THE GREATEST DISASTER . . .

Retail appliance dealers recently heard an association president offer his opinion as to the reasons for the decline in respect for appliance dealers, and suggest that they should be "protected" from dishonest and unfair competition.

"*The greatest disaster to have arisen in the appliance industry* during the 1950's was the decline in respect for the retail appliance dealers," Joseph Fleischaker, president of the National Appliance & Radio-TV Dealers Association (NARDA) told members of the Southeastern Indiana Appliance Dealers Association.

Mr. Fleischaker attributed some of this to "the strong efforts made by discount operations, the fight for position among appliance manufacturers, the dominant position of labor, and the increased importance that has been placed on capital.

"The appliance business is not a racket," Mr. Fleischaker said. "It's an honest, decent, and worthwhile American enterprise. It's a shame that throughout this country the laws of fair play are frequently not abided by in the appliance industry; a multiplicity of wholesale price lists without reason is often encountered; advertising that is far from truthful is evidently encouraged by some of the industry; and the sell-up theory of merchandising has sometimes fallen to the sell-out of respect, decency, and normal business ethics."

Mr. Fleischaker asked: "Where are the appliances going to be bought in the '60's? Will it be from the retail appliance dealers? Builders? Will they become part of a building like bricks, wood, and plaster?" He cited some ideas on this subject, saying in essence that sales should be handled through the appliance dealers to avoid chaos, and that protection should be provided appliance dealers from dishonest and unfair competition . . .

"I do hope that high standards for American retailers will be reestablished during the 1960's, and that the public will become fully aware of these standards, and that retailers can walk with decency and with honor, and without subsidy, beside their economic brothers in labor, capital, and agriculture."

Whose job is it?

Any readers who have had occasion to purchase appliances from "retailers" might have their own ideas concerning the job to be done to bring "high standards" back to the average retail dealer's establishment.

"IN THE NEXT TEN YEARS, MORE MINDS AND MORE DOLLARS WILL BE DEVOTED TO APPLIANCE RESEARCH AND DEVELOPMENT THAN EVER BEFORE. . .

"NEVER BEFORE IN THE HISTORY OF MAN HAVE WE BEEN ABLE TO LOOK SO FAR AHEAD, SO REALISTICALLY, AT WHAT IN DUE COURSE WILL BECOME A PART OF OUR EVERYDAY LIFE. . ."

from a statement by Herman J. Lehman, vice president, General Motors Corp., general manager Frigidaire Div.

There is little question that the appliance manufacturers have work to do in this direction, as do all segments of the manufacturer-distribution chain. Regardless of who is to blame for the present "low" in retail selling, the manufacturer will always be saddled with a great percentage of the responsibility.

Nevertheless, a shopping trip by any retail buyer will certainly disclose conditions in retail selling that can hardly be placed on the shoulders of the product manufacturers.

In many stores, fortunately not all, there is an utter lack of regard for the retail buyer, his interests, or his wants.

Selling-up certainly is a lost art in the average appliance outlet. In fact, "selling" in a true sense is sadly lacking in any constructive form.

The signs would point to the fact that appliance buyers are interested in conveniences, beauty, and *quality*, and not just price alone. Although there may be some agreement on this point, the fact remains that the idea has not penetrated to the retail sales management — or at least not to his salesmen who make the customer contacts.

We have no argument with some of Mr. Fleischaker's points with respect to the current situation at the retail level. Neither do we feel that the manufacturer can be entirely relieved of responsibility.

It is our strong belief, however, that if there is to be solid improvement, the shoe must first be fit to the proper foot — on the retail outlet management and the salesmen who wants to make his living in an honest and respectable business.

Dana Chase

EDITOR AND PUBLISHER

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3 to 5" inclusive	17.00	16.00	15.00
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CERAMIC ENGINEER

Challenging opportunity for graduate ceramic engineer in developing new methods and improved processes in the use of porcelain enamel. This opening is in the Product Engineering Department of an appliance manufacturing leader located in the midwest. Salary open. Outstanding benefit plans; a genuine career opportunity. **Send resumé and salary requirement to Box 1A, Dana Chase Publications, Inc., York St. at Park Ave., Elmhurst, Ill.**

METALLURGIST

Outstanding opportunity for a metallurgist interested in a career with an appliance manufacturing leader located in the midwest. Product engineering assignments will involve development of new processes and applications of metals for use in major appliances. Salary open. Outstanding benefit plans; a genuine career opportunity. **Send resumé and salary requirement to Box 1B, Dana Chase Publications, Inc., York St. at Park Ave., Elmhurst, Ill.**

WANTED . . . SHEET and PLATE USED or NEW DROP-OFFS

10 Ga. — 9 Ga. — ¼" — 5/16"
Other sizes, too. Also pipe couplings, thread protectors, pipe rejects and boiler tubes. Prompt pickup with our own trucks. Phone or wire COLLECT.

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MANAGER TECHNICAL SERVICES FOR WASHINGTON, D.C., TRADE ASSOCIATION

Engineer, preferably with industrial processing or sales experience, to coordinate all association technical projects and committees. Good communications skills. Some travel. Salary $8,000 to $12,000, depending on experience. Send resume, which will be held confidential, to **The Clifton Corp., Management & Personnel Consultants, 1832 M Street, N.W., Washington 6, D.C.**

Forecasts → *from Page 80*

dollar volume. They should equal 1957's figure of 3.7 million units, fifth highest in history, and conceivably could do still better.

The combination of a good refrigerator year, plus strong activity in the newer growth appliances, and another good year in automatic laundry equipment should mean a profitable year for all.

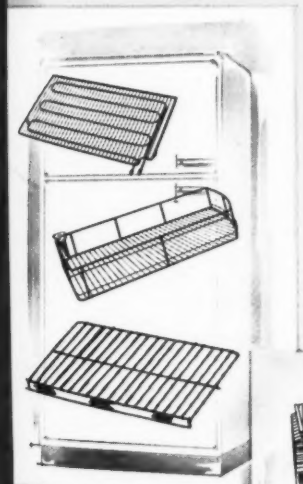
YOUR NEW APPLIANCE DESIGNER?

And that she is! Aside from her ubiquitous role as mother, homemaker, club woman, shopper and ultimate consumer of your best products—she *is* your new appliance designer.

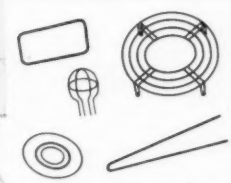
She knows exactly what she wants. High styling and functional beauty are important to her home decor. But even more, she wants *and expects* year upon year of convenience . . . plus dependable, maintenance-free service from each useable, functional part of any appliance.

Therefore—when your new appliance requires the finest in modern welded wire components, save valuable time by calling upon Union Steel. Take advantage of their experienced leadership in the design, fabrication, in-plant finishing and pre-planned delivery of beautifully styled, dependable welded wire components.

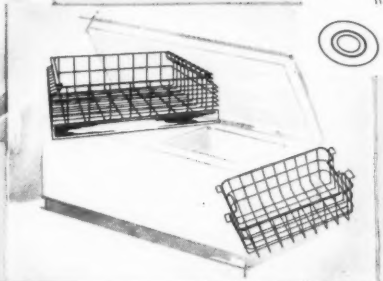
USP Service is as close as your phone. Union Steel's engineers will gladly assist you. A phone call to NA tional 9-2181 (Albion, Michigan) will be your best investment of the year.



Refrigerators and Upright Freezers Evaporators, Condensers, Baskets, Shelving, Trays and Racks



Wire Forms of All Types



Freezers . . . Baskets of All Types, Dividers, Special Sections

Washers and Dryers . . . Dishwasher Baskets, Sections, Glass Racks, Frames

Special Components... Rotisserie Units, Oven Heating Element Frames, Trivets, etc.

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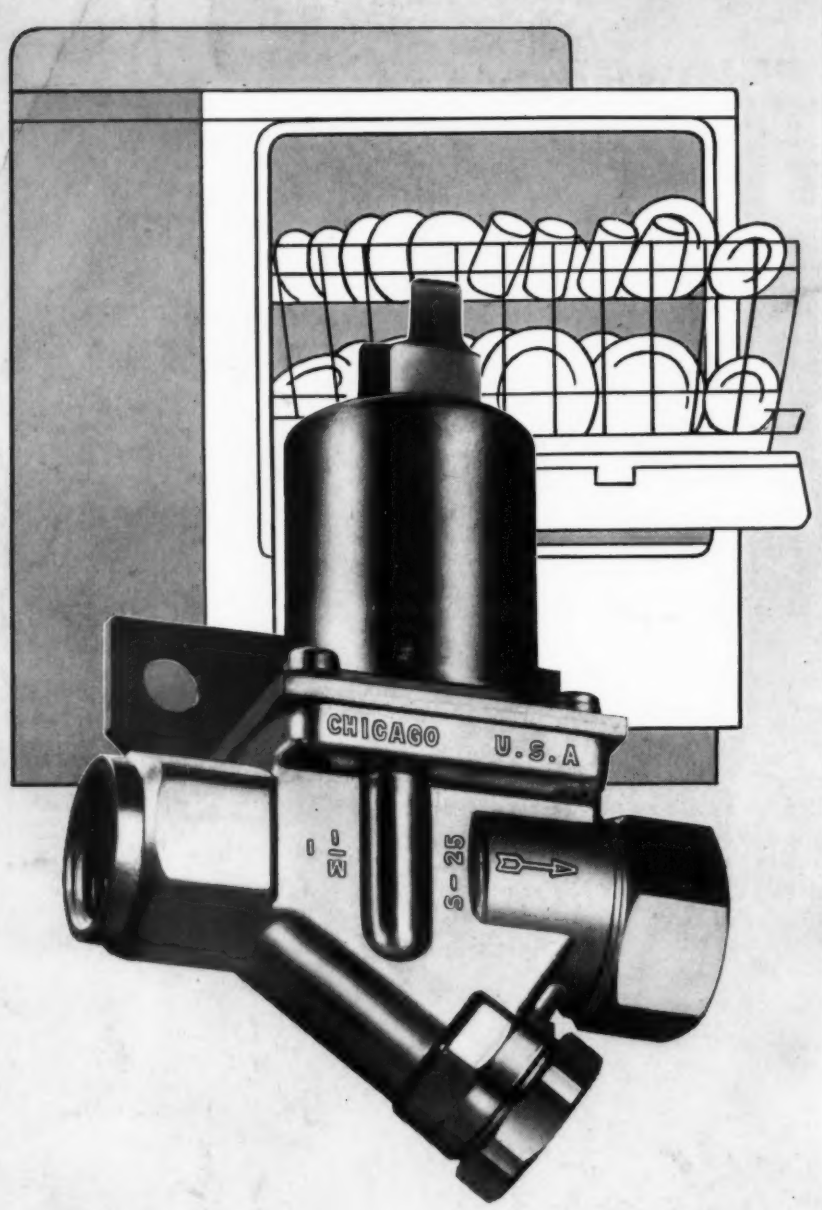
Ranges and Built-Ins Oven Heating Elements, Racks, Side Frames

UNION STEEL PRODUCTS CO.

Contract Wire Products Division **ALBION, MICHIGAN**

Incoming dirt CAN'T CLOG this new

DOLE DISHWASHER VALVE



Solves troublesome service problem—keeps customers satisfied

Now . . . for the first time . . . a dishwasher shut-off valve that is not affected by the tiny particles of dirt found in most incoming water supplies.

The new Dole Single Solenoid Valve incorporates an entirely new principle. A unique diaphragm and rubber poppet arrangement momentarily hold dirt in suspension . . . digest it . . . pass it through without clogging or damaging the automatic control.

Other valve designs permit trapping and holding of dirt resulting in jamming and refusal to close properly . . . eventual valve failure . . . costly part replacement.

This new Dole S-25 Single Solenoid Shut-off Valve insures continuous trouble-free operation . . . does away with costly service problems . . . and most important . . . keeps customers satisfied.

Dole pioneered the use of solenoid valves for turning water on and off, and regulating flow in automatic dishwashers. This newest design is a good example of Dole's continuous program of product improvement and development . . . finding better solutions to problems of fluid control.

If your products or projects involve questions of flow rate, mixing, temperature control, shut-off, dispensing . . . Dole Valves may be your answer.

DESIGN DATA

The improved Dole (S-25 Series) Single Solenoid Shut-off Valve was designed for applications requiring moderate flow rates (up to 5 GPM) and dependable remote, electrical operation. Contains patented flow control, special Monel inlet screen and slow-closing diaphragm that eliminates water hammer. Pressure capacity—200 psi. In addition to dishwashers, engineered for use in ice cube machines, water softener equipment, drinking fountains and dispensers.

Control with

DOLE

Additional information about this or other Dole Solenoid Operated Valves may be obtained by writing

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